CLERK'S COPY.

Vol. IV

TRANSCRIPT OF RECORD

DEFENDANT'S EXHIBIT I

Supreme Court of the United States

OCTOBER TERM, 1934.

No. 254

PARAMOUNT PUBLIX CORPORATION,
PETITIONER,

vs.

AMERICAN TRI-ERGON CORPORATION.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT.

PETITION FOR CERTIORARI FILED AUGUST 6, 1934.

CERTIORARI GRANTED NOVEMBER 5, 1934.

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1934

No. 254

PARAMOUNT PUBLIX CORPORATION,
PETITIONER,

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ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT

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JUDD & DETWEILER (INC.), PRINTERS, WASHINGTON, D. C., DEC. 31, 1934.

—5752-C.

[fol. ½] No. 439

AMERICAN TRI-ERGON CORP.

v.

PARAMOUNT PUBLIX CORP.

This is the DeForest Interference Record, Defendant's Ex. I, referred to under Point 3 in Defendant's Petition for Rehearing.

[fol. a]

UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Patent Appeal Docket

No. 2749

DEFOREST

vs.

VOGT, MASSOLLE AND ENGL

I, Arthur B. Shelton, Clerk of the United States Court of Customs and Patent Appeals, do hereby certify that the attached papers constitute true and correct copies of—

1. The opinion of this court of May 25, 1931, pages numbered 1 and 2,

2. The printed transcript of record, pages numbered 1 to 114,

3. The brief for DeForest, filed January 28, 1931, pages numbered 1 to 22,

4. The brief for Vogt, Massolle and Engl, pages numbered 1 to 64, filed April 18, 1931,

in the above entitled appeal, as the same severally remain of record on the files of this court.

Witness my hand and the seal of this court this twenty-first day of October, A. D., 1932.

Arthur B. Shelton, Clerk. (Seal United States Court of Customs and Patent Appeals.)

[fol. b] UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

October Term, 1930

Sut No. 2749

Pat. Cal. No. 241

Interference No. 53,103

DEFOREST, Appellant,

v.

VOGT, MASSOLLE, & ENGL, Appellee

HATFIELD, Judge:

This is an appeal from the decision of the Board of Appeals of the United States Patent Office affirming the decision of the examiner of interferences awarding priority of invention to appellee.

The invention relates to a method of producing talking moving pictures, and is sufficiently defined in count 1, which reads:

Count 1. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, and photographing the sound record on an unexposed portion of the picture film.

[fol. c] At the time of oral argument in this court, counsel for appellant stated that there were two methods of producing talking moving pictures on the same film, one of which did not comprise photographing simultaneously the picture and the sound upon separate films; that the counts in issue were limited to a method comprising photographing simultaneously the picture and the sound upon separate films; that, as the evidence produced by appellant was not directed precisely to the method of photographing simultaneously the picture and the sound upon separate films, he could not conscientiously ask the court to consider appellant's evidence as so limited; and that, under the circumstances, he would formally suggest that the decision of the Board of Appeals be affirmed.

Accordingly, it is unnecessary for the court to give consideration to appellant's assignment of error.

The decision is affirmed.

Affirmed.

[fol. d] UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Patent Appeal Docket

No. 2749

DEFOREST

vs.

VOGT, MASSOLLE and ENGL

Appeal from Board of Appeals. (Interference No. 53,103.)

TRANSCRIPT OF RECORD

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[fol. 1] IN THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Patent Appeal Docket

No. 2749

Interference No. 53103. Subject Matter: Recording Sounds.

LEE DEFOREST, Appellant,

vs.

HANS VOGT, JOSEPH MASSOLLE and JOSEF ENGL

To the U. S. Court of Customs and Patent Appeals:

Your petitioner, Lee DeForest, of New York, in the County of New York and State of New York, respectfully represents:

That he is the original and first inventor of certain new and useful improvements in Recording Sounds.

That on the 16th day of July, 1921, in the manner prescribed by law, he presented his application to the Patent Office, praying that a patent be issued to him for the said invention; and that a patent was issued to him on April 8, 1924, bearing No. 1489314.

That thereafter, to wit, on the 10th day of November, 1925, an interference proceeding was instituted and de-

clared between his said Letters Patent No. 1489314, and a pending application of Hans Vogt, Joseph Massolle and Josef Engl, Serial No. 547860, filed March 29, 1922, for a similar invention.

[fol. 2] That the subject matter of said interference, as set forth in the official declaration, was as follows:

"Count 1. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, and photographing the sound record on an unexposed portion of the picture film.

"Count 2. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, and photographing the sound record on an unexposed portion of the picture film between the marginal edge and the sprocket perforations thereof."

That thereafter, to wit, on the 14th day of July, 1928, the case having been submitted upon the preliminary statements and evidence presented by the parties thereto, the Examiner of Interferences rendered a decision awarding priority of invention to Hans Vogt, Joseph Massolle and Josef Engl.

That pursuant to the statutes and the rules of practice in the Patent Office in such case made and provided, Lee DeForest appealed from the said adverse decision of the Examiner of Interferences to the Board of Appeals, and, the case having been argued and submitted to said Board, a decision was rendered by said Board on the 7th day of January, 1930, affirming the decision of the Examiner of Interferences.

That on the 24th day of February, 1930, your petitioner, pursuant to sections 4912 and 4913, Revised Statutes of the United States, gave notice to the Commissioner of Patents of his appeal to this honorable court from the decision of the Board of Appeals awarding priority of invention to said Hans Vogt, Joseph Massolle and Josef Engl, as aforesaid, and filed with him, in writing specific reasons of appeal.

That the Commissioner of Patents has furnished your petitioner a certified transcript of the record and proceedings relating to said interference case, including the notice

and reasons of appeal, which transcript is filed herewith and is to be deemed and taken as a part hereof.

[fol. 3] Wherefore your petitioner prays that his said appeal may be heard upon and for the reasons assigned therefor to the Commissioner, as aforesaid, and that said appeal may be determined and the decision of the Board of Appeals be revised and reversed, that justice may be done in the premises.

Lee DeForest, by Samuel E. Darby, Jr., His Attorney.

Washington, D. C., April 9, 1930.

Indorsed: United States Court of Customs and Patent Appeals. Filed Apr. 9, 1930. Arthur B. Shelton, Clerk.

Department of Commerce, United States Patent Office

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of Certain Papers, including printed testimony as used before the Office, in the matter of Interference Number 53,193, DeForest vs. Vogt, Massolle and Engl, Subject Matter: Recording Sounds; said Papers being the Record for the United States Court of Customs and Patent Appeals.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the City of Washington, this second day of April, in the year of our Lord, one thousand nine hundred and thirty, and of the Independence of the United States of America the one hundred and fifty-fourth.

Thomas E. Robertson, Commissioner of Patents.
Attest: D. E. Wilson, Chief of Division. (Seal Patent Office, United States of America.)

[fol. 4] Application of Hans Vogt, Joseph Massolle and Josef Engl, Filed March 29, 1922. Serial No. 547860. Process for Producing Combined Sound Picture Films.

To all whom it may concern:

Be it known that we, Hans Vogt, Joseph Massolle and Josef Engl, citizens of the German Republic, and residents respectively, the first of Berlin-Wilmersdorf, the second and the third of Berlin-Grunewald, Germany, have invented a new and improved Process for Producing Combined Sound Picture Films of which the following is a full, clear and exact description:

In the production of speaking films — is of great advantage especially from the point of view of use, to arrange the sound sequence and the picture sequence upon one and the same material separate (film).

In this procedure, however, there frequently occur in consequence of the changing lighting conditions in the cinematographing process, changes in the degree of light and the bromide of silver layer, and this causes the picture sequence to be either overlighted or underlighted.

As the same film, however, bears close to the picture sequence the continuously normally lighted sound sequence, these differences cannot be removed in the case of combined negatives by developing, weakening, strengthening and so forth. They can only be removed by subjecting the underlighted or the overlighted negative places to separate corresponding treatment.

Technically, this treatment is practically impossible so long as the two sequences are photographed upon the same film.

According to the present invention the difficulty is overcome by either employing entirely separate films for the production of the negatives or films which are connected during the photographing, but which are separated from one another before the developing.

The synchronism is assured in both cases by the perforations and by corresponding marks. The production of the positive films can take place by copying the two negative films preferebly consecutively upon the same positive films. [fol. 5] One can however, also unite previously the two negative films longitudinally together, and then copy this so united negative in the usual manner.

We claim:

1. Process for the production of combined sound and picture films, in which the sound sequence and picture sequence positives are copied upon single film, characterized

by the feature that the respective negatives have been developed separately.

2. Process for the production of combined sound and picture films according to claim 1, characterized by the feature that the photographing of the sound sequence and of the picture sequence takes place on separate films.

3. Process for the production of combined sound and picture films as set forth in claim 1, characterized by the feature that the photographing of the sound sequence and of the picture sequence takes place upon a single film and subsequently divided.

4. Process for the production of combined sound and picture films as set forth in claim- 1 to 3, characterised by the feature that the negatives after development are re-united.

Hans Vogt, Joseph Massolle, Josef Engl. Witnesses: Bruno Learwenka, John W. Bulkley.

(Here follows drawing, side folio 5a)

5752

81

No. 2749 Patent Appeal Docket.

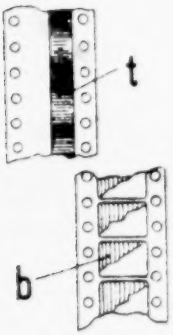


Fig. 1

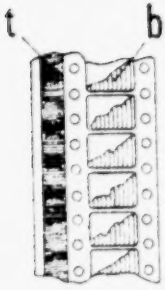


Fig. 2

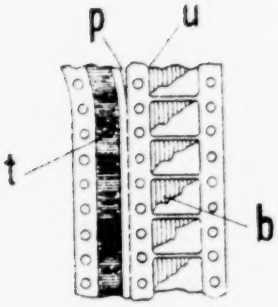


Fig. 3

INVENTOR
Hans Vogt
Joseph Massolle
Josef Engl
BY Munn & Co.
ATTORNEYS

AMENDMENT, APRIL 1, 1925

Hon. Commissioner of Patents.

SIR:

In response to Patent Office action of January 26, 1925, please amend the above entitled application as follows:

* * * * * * *

D'. 3. The method of producing talking moving pictures on the same film which comprises photographing simultane- [fol. 6] ously upon separate films the picture and the sound, and photographing the sound record on an unexposed portion of the picture film.

4. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, and photographing the sound record on an unexposed portion of the picture film between the marginal edge and the sprocket perforations thereof.

* * * * * * *

Respectfully submitted, Hans Vogt, Joseph Massolle and Josef Engl, by Ward, Crosby and Smith, their Attorneys.

April 8, 1924. 1,489,314

L. DE FOREST

RECORDING SOUND

Filed July 16, 1921

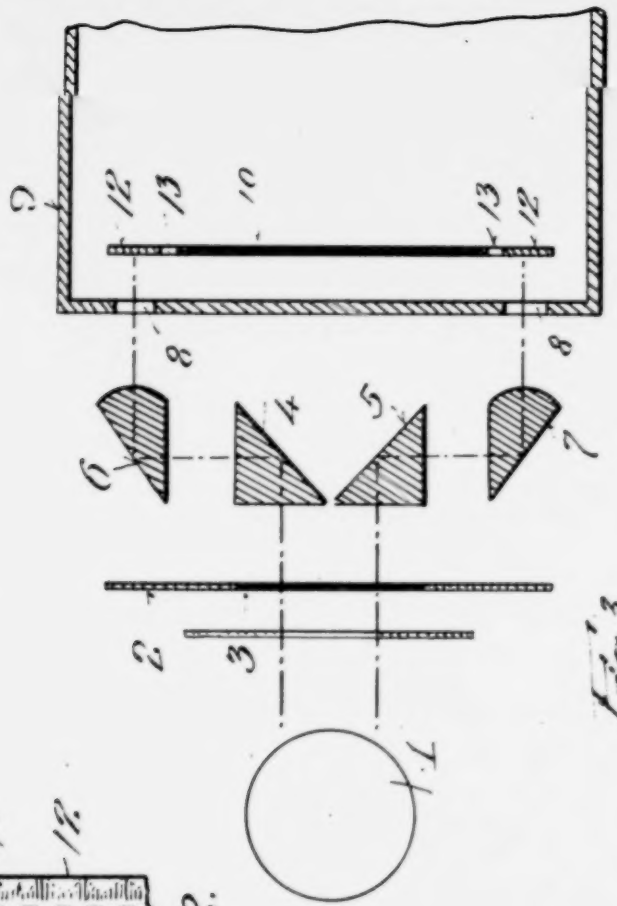
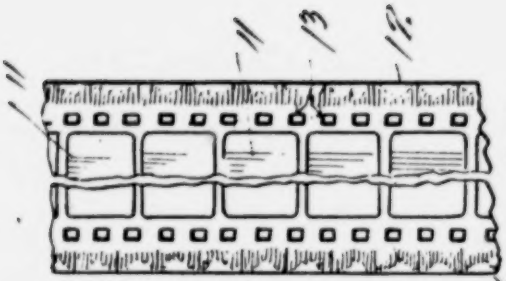


Fig. 3.



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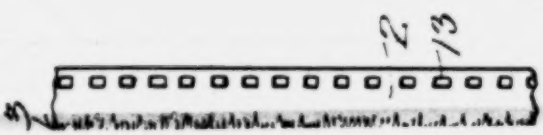

Fig. 1.

Patented Apr. 8, 1924.

UNITED STATES PATE

LEE DE FOREST, OF NEW YORK, N. Y., ASSIGNOR, BY
FOREST PHONOFILM CORPORATION, OF JERSEY CI
TION OF DELAWARE.

RECORDING SOUND.

Application filed July 16, 1921. Serial

To all whom it may concern:

Be it known that I, LEE DE FOREST, a citizen of the United States, residing in the city of New York, county and State of New York, have made a certain new and useful Invention in the Art of Recording Sound, of which the following is a specification.

This invention relates generically to the art of recording sound and more specifically where such record is obtained photographically for use in connection with photographic sound records such as films or the like, and is especially adaptable for use in connection with the art of motion picture photography.

The object of the invention is to provide means which are simple, economical and efficient for photographing sound record on films.

A further object of the invention is to provide means which are highly effective for accurately recording sounds on the marginal edges of a standard motion picture film.

Further objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts and the method employed in connection therewith, all as will be more fully hereinafter set forth, as shown by the accompanying drawing and finally pointed out in the appended claims.

Figure 1 is a fragmentary view of a sound record embodying the principles of my invention.

Fig. 2 is a similar view showing the sound record applied to the marginal edge of the motion picture film in accordance with my invention.

Fig. 3 is a diagrammatic view illustrating

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DE FOREST

CORDING SOUND

July 16. 1921

Fig. 3.

Fig. 2.

Fig. 1.

Patented Apr. 8, 1924. 1,489,314

UNITED STATES PATENT OFFICE.

LEE DE FOREST, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO DE FOREST PHONOFILM CORPORATION, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF DELAWARE.

RECORDING SOUND.

Application filed July 16, 1921. Serial No. 485,332.

To all whom it may concern:

Be it known that I, LEE DE FOREST, a citizen of the United States, residing in the city of New York, county and State of New York, have made a certain new and useful Invention in the Art of Recording Sound, of which the following is a specification.

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Fig. 2 is a similar view showing the sound record applied to the marginal edge of the motion picture film in accordance with my invention.

Fig. 3 is a diagrammatic view illustrating the principle involved in recording the sound inside the intermittent feed perforations of the said film.

I find that if the original photographs of such sound-controlled light fluctuations be made large so that the width of the maximum amplitude of such photographic track be, say one-half inch or more, a more exact and faithful photograph containing any details of the finest light variations produced by sound waves will be obtained. For use as a sound record per se this type of record is satisfactory, but as is readily apparent it would be too large a record to use in connection with a motion picture film unless used independently therefrom and therefore necessitating the various problems of synchronism which have always been considered, and still are considered to be the objectionable problems in this art. In accordance with my invention, however, I produce the large, accurate and definite sound record on a film, for example, as shown in Fig. 1, and therewith reduce photographically the record thus obtained and print the same on one or both marginal edges of the motion picture film as shown in Fig. 2.

In the production of the photographic sound record of Fig. 1 it will be observed that the record is symmetrical on both sides of the axis thereof and it will readily be apparent that a highly effective and efficient record can be obtained by photographing the record contained on opposite sides of the axis thereof, on the marginal edge. This is accomplished, in accordance with my invention, in the manner illustrated in Fig. 3 wherein the sound record film 2 containing thereon the sound record 3 is passed between a light source 1 and 2 and prisms 4 and 5 so arranged that the sound record on one side

Fig. 3.

Fig. 2.

Fig. 1.

INVENTOR
Lee de Forest
BY his ATTORNEYS Darby & Darby

TION OF DELAWARE.

RECORDING SOUND.

Application filed July 16, 1921. Serial No.

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Fig. 3 is a diagrammatic view illustrating the principle involved in recording the sound waves photographically, in accordance my invention, on the marginal edge of a standard motion picture film.

The same part is designated by the same reference character wherever it occurs through the several views.

In my co-pending application, Serial No. 391,705, filed June 25, 1920, I show and describe methods for photographing sound-produced fluctuations of a source of light upon one or both margins of a standard motion picture film either outside or directly inside the int
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Fig. 3.

Fig. 2.

Fig. 1.

INVENTOR
Lee de Forest

ATTORNEYS Darby & Darby

RECORDING SOUND.

Application filed July 16, 1921. Serial No. 485,332.

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I find that if the original photographs of such sound-controlled light fluctuations be made large so that the width of the maximum amplitude of such photographic track be, say one-half inch or more, a more exact and faithful photograph containing any details of the finest light variations produced by sound waves will be obtained. For use as a sound record per se this type of record is satisfactory, but as is readily apparent it would be too large a record to use in connection with a motion picture film unless used independently therefrom and therefore necessitating the various problems of synchronism which have always been considered, and still are considered to be the objectionable problems in this art. In accordance with my invention, however, I produce the large, accurate and definite sound record on a film, for example, as shown in Fig. 1, and therewith reduce photographically the record thus obtained and print the same on one or both marginal edges of the motion picture film as shown in Fig. 2.

In the production of the photographic sound record of Fig. 1 it will be observed that the record is symmetrical on both sides of the axis thereof and it will readily be apparent that a highly effective and efficient record can be obtained by photographing the record contained on opposite sides of the axis thereof, on the marginal edge. This is accomplished, in accordance with my invention, in the manner illustrated in Fig. 3 wherein the sound record film 2 containing thereon the sound record 3 is passed between a light source 1 and 2 and prisms 4 and 5 so arranged that the sound record on one side of the axis of the film 2 is reflected in one direction and the record on the other side of the film is reflected in the opposite direction by means of the prisms 4 and 5. It will, of course, be understood that it is the light rays affected by the sound record 3 that are reflected by the respective prisms 4 and 5. The reflected light rays are again reflected by prisms 6 and 7 to direct the same in parallel lines through orifices 8 in the casing 9, in which the motion picture film 10, either exposed as to the picture spacing 11 thereof and unexposed as to the marginal edge

thereof or unexposed as to its entire surface, is located. Means are provided to reduce, in size, the sound record 3 contained on its film 2, to the necessary size to be accurately and completely recorded on the marginal edges 12 of the film 10. This means may comprise suitable lenses or preferably a combination of a convex lens with the prisms 6 and 7, as shown. By means of this arrangement it will readily be apparent to those skilled in the art that the large, clear, distinct sound record 3 contained on its film 2 may be accurately reproduced in smaller, but nevertheless complete detail on one or both marginal edges 12 of the motion picture film, to thereby enable utilization of the space of the film contained between the intermediate feed perforations 13, and the edge or edges thereof.

It will also be readily apparent to those skilled in the art that by suitable location of the prisms 4, 5, 6, 7, and the orifices 8 of the casing 9, the reproduction of the sound record may be effected on any other desired part of the film. By suitable variation in the form of the prisms 6 and 7, or the utilization of suitable lenses, the original sound record may be reduced in size, reproduced as of the same size or enlarged, as desired.

Many other modifications and changes in details will occur to those skilled in the art without departing from the spirit and scope of my invention as defined in the claims, but having now set forth the objects and nature of my invention, and having shown and described structures embodying the principles thereof and illustrating the method employed in accordance therewith, what I claim as new and useful, and of my own invention, and desire to secure by Letters Patent, is:—

1. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, and photographing the sound record on an unexposed portion of the picture film.

2. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, reducing the size of the record, and photographing the reduced sound record upon an unexposed portion of the picture film.

3. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, and photographing the sound record on an unexposed portion of the picture film between the marginal edge and the sprocket perforations thereof.

4. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, reducing the size of the record, and photographing the reduced sound record upon an unexposed portion of the picture film between the marginal edge and the feed sprocket perforations thereof.

In testimony whereof I have hereunto set my hand on this 14th day of July, A. D. 1921.

LEE DE FOREST.

[fols. 10 & 11] [Stamp:] U. S. Patent Office, Docket Division, Feb. 6, 1928

IN THE UNITED STATES PATENT OFFICE

Interference No. 53,103

HANS VOGT, JOSEPH MASSOLLE and JOSEF ENGEL

vs.

LEE DEFOREST

Ward, Crosby & Smith, Attorneys for Vogt, Massolle and Engl. S. Mortimer Ward, Jr., of Counsel.

RECORD OF HANS VOGT, JOSEPH MASSOLLE AND JOSEF ENGEL

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[fol. 13] IN THE UNITED STATES PATENT OFFICE

Interference No. 53,103

HANS VOGT, JOSEPH MASSOLLE and JOSEF ENGEL

vs.

LEE DEFOREST

The Issue

1. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, and photographing the sound record on an unexposed portion of the picture film.

2. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, and photographing the sound record on an unexposed portion of the picture film between the marginal edge and the sprocket perforations thereof.

[fol. 14] IN THE UNITED STATES PATENT OFFICE

Interference No. 53,103

HANS VOGT, JOSEPH MASSOLLE and JOSEF ENGEL

vs.

LEE DEFOREST

PRELIMINARY STATEMENT OF HANS VOGT, JOSEPH MASSOLLE AND JOSEF ENGL

Hans Vogt, a resident of Berlin-Wilmersdorf, Germany, and Joseph Massolle and Josef Engl, residents of Berlin-Grunewald, being duly sworn, depose and say that they jointly, are party to the interference declared by the Commissioner of Patents, November 10, 1925, between their application for patent, filed March 29, 1922, Serial No. 547,860, entitled "Process for Producing Combined Sound and Picture Films," and the patent of Lee DeForest, granted April 8, 1924, No. 1,489,314, for an improvement in "Recording Sound"; that they jointly made the invention contained in claims 3 and 4 of their application declared to be involved in this interference as counts 1 and 2 respectively, thereof, being at that time in Germany; that patents for [fol. 15] such invention were applied for and obtained by them as follows:

Application filed in France, April 5, 1922, patent dated April 5, 1922, No. 549,728, granted the 28th day of November 1922, and published the 17th day of February, 1923.

Application filed in Germany, April 14, 1921, published the 7th day of September, 1922, patent dated April 15, 1921, No. 368,383 and granted the 21st day of November, 1922.

Application filed in Great Britain, April 11, 1922, patent dated 14th April, 1921, No. 178,442, specification open to inspection in its then condition although not accepted 14th April, 1922, printed official abridgment of specification in the condition in which it was when open to inspection 14th June, 1922, specification accepted and open to inspection in its accepted condition 16th November, 1922, specification printed and copies on sale 6th December, 1922, patent actually sealed 1st February, 1923.

Application filed in Italy, March 24, 1922, No. 208,496—No. 9/602 granted the 17th day of May, 1924, and published the 17th day of May, 1924; patent dated March 24th, 1922.

The invention was never fully described in a printed publication other than the patents above referred to.

The invention was introduced into the United States by the application papers, viz., the present application, Serial No. 547,860, which papers were received in the United [fol. 16] States on or about the 24th day of March, 1922.

Hans Vogt, Joseph Massolle, Josef Engl.

Subscribed and sworn to before me this 6th day of January, 1926, by Messrs. Hans Vogt, Joseph Massolle and Josef Engl. E. T. Smith, Consul of the United States of America at Berlin. (Seal American Consulate.) $2.00 Fee Stamp. Service No. 112. $2.=m. 8.60.

[fol. 17] [Stamp:] U. S. Patent Office, Docket Division, Mar. 6, 1928

IN THE UNITED STATES PATENT OFFICE

Interference No. 53,103

LEE DEFOREST

v.

MASSOLE, ENGL & VOGT

Darby & Darby, Attorneys for DeForest. Samuel E. Darby, Jr., L. D. Fletcher, of Counsel.

RECORD ON BEHALF OF DEFOREST

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[fol. 19] In the United States Patent Office

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v.

Vogt, Massole & Engl

In re Patent to Lee DeForest No. 1,489,314, Granted April 8, 1924, on Application, Serial No. 485,332, Filed July 16, 1921, for Recording Sound

Preliminary Statement

County of New York,
State of New York, ss:

Lee DeForest, being first duly sworn, deposes and says as follows: I am the patentee of the above entitled patent and declared to be involved in the above entitled interference; that I conceived the invention set forth in the counts of said interference on or about January 1, 1921; and I first disclosed the invention to others on or about the first

day of January, 1921; that I made the first written description and drawing of the invention on or about January 1, 1921; that the invention was first reduced to practice on or about January 15, 1921; that the invention has been used commercially but not to any great extent.

Lee DeForest.

Sworn to and subscribed before me this 14th day of December, 1925. Rose A. Batterman, Notary Public. (Notarial Seal.) New York Co. Clerk's No. 802, Reg. No. 6199A. Commission expires March 30, 1926.

[fol. 20] IN THE UNITED STATES PATENT OFFICE

Interference No. 53,103

LEE DEFOREST

against

MASSOLLE, ENGL & VOGT

TESTIMONY ON BEHALF OF PARTY DEFOREST

Depositions taken on behalf of the Party DeForest, pursuant to agreement of counsel, at the offices of Darby & Darby, 220 Broadway, New York, New York, before Augusta P. Boos, Notary Public, Thursday, January 5, 1928, commencing at 10:30 o'clock in the forenoon.

Present:

S. E. Darby, Jr., Esq., and L. D. Fletcher, Esq., on behalf of Party DeForest.

S. Mortimer Ward, Jr., Esq., on behalf of Party Massolle, Engl & Vogt.

(The presence of Mr. John M. Joy as an observer is noted.)

Deposition of Dr. Lee DeForest

DR. LEE DEFOREST, called as a witness in his own behalf, having been first duly sworn, testifies as follows, in response to questions by Mr. Darby:

Direct examination.

By Mr. Darby:

Q. 1. Please state your name, age, residence and occupation.

A. Lee DeForest, 54 years, residence, Spuyten Duyvil, [fol. 21] New York City, occupation, inventor and research engineer.

Q. 2. You are the applicant of the DeForest application involved in this interference?

A. I am.

Q. 3. I call your attention to the counts of the interference so as to familiarize yourself with the subject-matter involved, and ask you to please read them.

A. Yes, I have read them.

Q. 4. Do you claim to be the inventor of the subject-matter of those counts?

A. I do.

Q. 5. Will you please recite the story of your making the invention of these counts, giving dates, and referring to any documentary records that you have thereof.

A. I began my work in recording sound photographically in 1919. Having determined that it was possible to solve the problem of talking motion pictures along that principle, I devoted myself to the general problem in all its phases.

Having conceived three methods of recording sound photographically on motion picture film, I applied myself to working out these three methods to determine which was the most practical. This work extended from 1919 until July, 1921, at which time I left New York to visit Germany. Previous to this date, my experiments had been carried on at the High Bridge plant of the DeForest Radio Company, Sedgwick Avenue, New York City. My three earliest notebooks, which I have before me, date from November, 1919, to January 26, 1922.

Q. 6. Was it your practice to keep notebook records of your work?

[fol. 22] A. It was. I was very careful during this period to make note of almost every experiment which I conducted and also the line of research which I proposed to work, jotting down, usually in pencil, the conditions of a certain experiment before same had been carried out, and writing out the results thereof in ink, so that it would be very easy

to distinguish by glancing over my notes between what I proposed to do and the results obtained from the work.

Q. 7. Which was it you jotted down in ink, the results or the proposed work?

A. Results. The conditions under which the tests were made are in pencil.

Q. 8. Was that your practice throughout all of the notebooks, or was it your intention to distinguish between what you proposed to do and the results that you obtained?

A. It was my practice during this work on phonofilm—talking motion pictures—to use the two methods of describing, although I had not adopted this method generally in my previous work in radio.

Q. 9. My question is: Did you have any fixed rule as to which would be put in ink and which would be put in pencil; or was it merely your intention to distinguish between them by having either the one or the other in pencil?

A. It was the latter, to distinguish between them, that is, between the conditions of the experiment and the results obtained, so I could tell at a glance, in looking over my notes, the difference—could distinguish between the two subjects. In some of the notes you will find the conditions preceding the experiments to be written in ink and the results in pencil; some of the notes are reversed.

[fol. 23] Q. 10. Confining yourself now to the subject-matter of the present controversy, will you please refer to the first record that you have bearing on this subject, and state the circumstances under which the record was made.

A. The first note that I find in my notebook. No. II, bearing on this point, is under the date of December 26, 1922——

By Mr. Darby: What date?

(Answer continued:) December 26, 1920. Under this date, under paragraph lettered "8," I find the following comment on the result obtained from the Record #8—Photographic Sound Record #8—made on that date:

"Too faint. Had to develop this film for 6 minutes to get at all heavy track, this completely fogged it. So a *picture* would have been ruined."

By Mr. Ward: Counsel asks whether the witness is going to contend that he had a conception of the invention at

issue at the said date of December 26, 1920. If so, counsel wishes to object to the last answer and all other answers bearing any date prior to January 1st, 1921, according to the preliminary statement.

By Mr. Darby: We will contend that Dr. DeForest had a conception of the invention at least as early as the date of this entry; but we recognize that, under the rules controlling the matter, by virtue of Dr. DeForest's preliminary statement, there may be circumstances whereby proof of [fol. 24] conception of the date of this notebook record may of necessity be limited to the date alleged in the preliminary statement.

By Mr. Ward: The last question is, therefore, objected to, and it is moved that it be struck from the record.

Q. 11. Will you please explain in non-technical language the meaning of this entry and the significance of it, going into the matter of what the entries in the notebook refresh your recollection as to what you were actually doing at the time this entry that you have quoted from was made.

A. At that period—December, 1920—I was working on various types of sound-controlled sources of light, for the purpose of photographically recording fluctuations of said light produced by sound waves, directly or indirectly. I had experienced great difficulty in getting sufficiently actinic light which would respond to telephonic frequencies, and had been, therefore, experimenting with various types of motion picture film, for example, X-ray film, superspeed film, panchromatic film, etc. The note under heading, December 26, states that I was using at this time X-ray film.

On account of the aforementioned lack of photographic quality of the light source I was employing, said light falling through a very narrow slit upon a film traveling at about 60 feet per minute, I found it necessary to overdevelop the film in order to obtain a satisfactory sound record on same. Inasmuch as I had in my mind from the very beginning of my work the combining of sound record and motion picture photograph on the same film, it occurred to me about this time—when I found that overdevelopment of [fol. 25] the film for a sound record was necessary—that said overdevelopment would fog the picture, were a picture taken at the same time upon the same film—same negative film.

Looking further through this notebook, I find, under date of December 28, 1920, under paragraph 8 thereof, the following comment:

"Developed this last *10* minutes until well fogged. This would be too long for cine *picture*. Hence will probably need to make 2 negatives (picture and sound) and print on *same* pos."

Looking further through this same notebook, I find, under date of January 18, 1921, under paragraph 8 thereof:

"Developed 11 minutes (very cold day) (longer development is best for *sound* film but *not* for picture. Hence will probably use 2 films)."

A perusal of this and the following notebook shows in countless instances that I was having trouble in obtaining satisfactory photographic records of sound without overheavy—over-long—development of the negative and consequent fogging of same.

Under date of April 6, 1921, is the following comment on result obtained from a sound record film which I had sent up to Dr. Mees, of Eastman's, Rochester, for special development by him. The note reads:

"April 6. Second half of film developed by Dr. Mees at Eastman's. In *appearance* it is clearer (and cleaner!) than [fol. 26] my half. These records reproduce quite noticeably better than those I developed. #3 is the best of lot. Mees developed *this* record until it was quite fogged—too much for a picture film."

Q. 12. Now, will you please state briefly and concisely the signficance of the substance of those entries.

By Mr. Ward: Objected to as calling for secondary evidence. The entries speak for themselves.

A. As stated above, I had from the very start embarked on this work with the idea of photographing sound and motion picture on the same film. When I first conceived a method of solving this problem, I did not foresee I would have the difficulty which I soon encountered of obtaining sufficiently actinic light source for sound recording, a light source which in intensity could be compared—would be

comparable—to the light used upon the subject of the motion picture itself. However, soon after my work revealed this fault of the recording light to me, and my continued developments of photographic sound records showed that it was frequently necessary to overdevelop the negative in order to obtain a sufficiently dense sound record thereon, the problem suggested itself to me as how this overdevelopment would affect the picture when the picture was also recorded on the same film. The solution of this difficulty which I conceived was to use in this case two films, one for a picture and the other for a sound, and to develop each negative as it should be developed in order to properly ob- [fol. 27] tain an exposure thereon—in order properly to bring out the exposure thereon; and to subsequently print from both negatives, one carrying the sound and the other the picture, upon the same positive; so that in reproducing the talking motion picture I would have to deal with only one positive film.

The notes from which I have quoted give the dates when this conception and solution of the problem came to me. I discussed this matter on repeated occasions with my assistant, Mr. William Garity, and also with Mr. Senner, who was in charge of the motion picture department of the optical supply house, Herbert & Huesgen, East 42nd Street, New York City. From Mr. Senner I was purchasing at that time all my film used in my experiments, my developer equipment, developing and fixing solutions, and my motion picture camera. I discussed these problems and the development of my films with Mr. Senner. My notebooks show that I took my first films on which sound had been recorded photographically to Paul Thompson for development, but that shortly after I began to take them to Herbert & Huesgen, where I discussed the various photographic matters involved in my work with Mr. Senner.

By Mr. Ward: That part of the answer which refers to what the witness' notebook shows is objected to as secondary evidence, unless the entries in the notebook are produced, showing the same.

By Mr. Darby: I offer in evidence the DeForest Notebook No. II, the entries appearing to be dated from October, 1920, to April 6, 1921; and ask that the same be marked, "DeForest Exhibit No. 1." For convenience of counsel, I have had

[fol. 28] turned down the marginal edge of the pages on which the entries read by Dr. DeForest are contained, and will mark these entries, in the order in which they were read into the record, on the turned-down edge of the page:

"1" for entry of December 26, 1920;
"2" for entry of December 28, 1920;
"3" for entry of January 18, 1921;
"4" for entry of April 6, 1921.

Q. 13. In Notebook III, under date of July 27, appears an entry entitled, "Garry's Picture," and the next succeeding entry is dated December 8, 1921, "Berlin." Am I correct in understanding from your previous answer that you left for Berlin in July, 1921?

A. Yes; it was the last day of July, as I recall it, or possibly the 30th, I sailed for Berlin. I returned in September to New York, merely to pack up my apparatus and move my laboratory to Berlin, where I recommenced my work as soon as my apparatus had arrived and was set up in my new laboratory.

Q. 14. From December, 1920, until the last day of July, 1921, when you left for Berlin, what proportion of your time were you devoting to this line of investigation in the talking motion picture art?

By Mr. Ward: Question objected to as indefinite.

A. At least three-quarters of my time was devoted to the phonofilm problem, and the balance was devoted to radio telephone matters.

[fol. 29] Q. 15. Are all of the entries in these two notebooks between the dates I last gave you in your own handwriting, so far as you know?

A. Yes; I do not think there is any entry by anyone else in the book.

By Mr. Ward: In view of the last answer, the notebook is objected to as the witness' notebook, unless he can identify as being his own handwriting each and every entry therein relied upon.

Q. 16. Are each of the entries that you have read into this record in your own handwriting?

A. Yes.

Q. 17. You made those entries yourself.

A. I did.

Q. 18. And when did you make each of the respective entries with respect to the date appearing on the pages that you have referred to?

A. Either on that date or on the day following. It sometimes happened that my work for the day ended with the development and fixing of the film and placing same on the drying rack, and I was in no position to test said film until the following day. The tests of the film, however, were made at the first possible opportunity, and my comments based on said tests were immediately entered into the book,—each comment in the space which I had left in the notebook under the line describing the conditions under which that particular test had been made.

Q. 19. Do all of the entries of the notebook record work actually done by you where result entries are made?

A. Yes, they do.

Q. 20. Do the entries during that period fairly indicate, [fol. 30] in your opinion, the amount of time that you were devoting to phonofilm problems?

By Mr. Ward: Objected to as vague and indefinite, and as leading.

A. Yes, the dates show that I was working practically every day,—Sundays and holidays included,—on these phonofilm problems; but they do not show how much of each day was devoted to this task.

By Mr. Darby: I offer in evidence the notebook beginning with an entry of April 23, 1921; and ask that the same be marked, "DeForest Exhibit No. 2."

Q. 21. You have referred in your testimony to an assistant, William Garity. Was he your assistant throughout the period between December, 1920, and July, 1921?

A. Yes; whenever I required the services of an assistant, I called Garity in. However, Garity spent by far the largest part of his time in the Radio Laboratory, and not in helping me on my phonofilm experiments. I discussed the problems with Gariety from time to time.

Q. 22. I notice in that period a name in one of the notebooks,—"Logwood." What is the full name of Logwood, and state who he is and where he is.

A. Charles V. Logwood was my chief radio assistant during all the years that I was working at the High Bridge

Laboratory,—that is, from 1913 to 1921. I called Logwood in from time to time to show him results I was obtaining in phonofilm work, and discussed the problems as they arose with him. Unfortunately, Mr. Logwood died last summer.

Q. 23. Did you do any phonofilm experimental work when [fol. 31] you returned to the United States in September, 1921, to pack up your things to go back to Germany, according to one of your answers?

By Mr. Ward: Objected to as vague and indefinite.

A. My recollection is that I did no work on phonofilm whatever during the brief period I was in New York preparing to return to Berlin.

Q. 24. About how long were you in New York?

A. About three weeks.

Q. 25. I call your attention to the fact that your application involved in this interference was filed July 16, 1921. Had you attempted to actually use the invention of this interference prior to the filing date of your application?

By Mr. Ward: Objected to as leading.

A. No, I did not, for the reason that I had only my motion picture camera—my one motion picture camera—and no available method of using another camera synchronized to the first one, through one of which cameras the sound record film could be passed, while the other camera was recording the picture on its film.

Q. 26. What do you mean by the expression, you had "no available method"?

A. I would have had to have two cameras,—one for sound and one for picture—and the two synchronized by some mechanical or electrical means in order to record simultaneously sound and picture on two separate negatives.

Q. 27. That is, you did not have the apparatus necessary to do that?

A. I did not.

Direct examination closed.

[fol. 32] Cross-examination.

By Mr. Ward:

X Q. 28. How long have you had a clear understanding of what the claims of your patent here in interference cover?

A. Since they were first presented to me by my attorney. I don't remember the exact date.

X Q. 29. Well, would that be shortly after the patent issued, or at the time this interference was declared, or what?

A. At the time the application was prepared and those claims added, although I cannot now state that those particular claims were originally in the specification—the text of the specification. The record would show that.

X Q. 30. Well, at any event, by the date of issue of the patent, you were familiar with what the claims of the patent covered?

A. Yes.

X Q. 31. You state that your notebook shows that you took your first sound record films to Paul Thompson for development. Where is that shown?

A. Let me look at the Notebook No. I. (Witness examines notebook.) The first note I find to this effect is in Notebook No. I, under date of December 16, 1919:

"Note.—This film developed by Paul Thompson—while second film was by Herbert & Huesgen and showed much more detail."

X Q. 32. You have referred to the fact that you invented three methods of recording sound photographically on motion picture film. Please describe very briefly the three methods you have reference to.

[fol. 33] A. The method of the speaking flame; the short incandescent filament lamp; and the gas-filled glow lamp.

X Q. 3. That is, those subjects-matter related to photographing sound on a film by those three types of light source; is that right?

A. That is correct.

X Q. 34. You stated that from 1919 to July, 1921, you applied yourself to the working out of these three methods to determine which was the most practical; that is correct, is it not?

A. It is.

X Q. 35. And in doing that work, it is not necessary, is it, to resort to taking a picture record on one film and a sound record on another and printing these on a third?

A. No; for these preliminary experiments, negative exposure only was sufficient. It was not necessary to make a print of any sort in order to determine the quality of sound record which I had secured.

X Q. 36. Now, you referred to it being your custom to keep notebooks. How long were you keeping notebooks on your phonofilm sound recording work?

A. From practically the very first of my experiments I kept notes. The first date in the notebooks which I have is November 7, 1919, but I kept my notes of work prior to this date in another laboratory notebook in connection with my radio work.

X Q. 37. And was it your custom to put down all your experiments in your notebooks?

A. Not all, but most of them.

X Q. 38. And where have you had, during the last three years, the three notebooks which you have produced at this [fol. 34] testimony, which date from November 7, 1919?

A. They have been in my studio at 318 East 48th Street, until the interference between myself and Tri-Ergon—the first interference between one of my patents and Tri-Ergon's patent application was declared, since which time these notebooks have been in the possession of Mr. Darby.

X Q. 39. That is, since the date of declaration of the Interference 51,947, involving your patent 1,482,119, and on application owned by Tri-Ergon Company of Engl, Massolle & Vogt?

A. That is correct.

X Q. 40. And where have these three notebooks which you produced at this hearing been since July 1st, 1926—at the same place or places?

A. Yes.

X Q. 41. The two notebooks, Exhibits No. 1 and No. 2, have then been either in your possession or in the possession of your attorney, Mr. Darby, since July 1st, 1925?

A. Yes.

X Q. 42. And in Mr. Darby's possession from that date until January, 1926?

A. Yes; and since that latter date.

X Q. 43. And since January 1st, 1926, where has the other notebook been, in which you say you recorded your first experiments?

A. I brought all of the notebooks down to Mr. Darby at the same time—Notebooks Nos. I, II and III.

X Q. 44. I refer particularly to the one about which you said you made the records in your notebook on radio work.

A. That book was one which was left in the radio labo-

[fol. 35] ratory at 1391 Sedgwick Avenue and was destroyed in the fire.

X Q. 45. In the above-mentioned Interference No. 51,947 between yourself and Engl, et al., involving your patent 1,482,119, you testified as a witness did you not?

A. I did.

X Q. 46. On page 96 of your record, in answer to Q. 60, I read you the following:

"Q. 60. Did you keep any notebook records up to September, 1919?

"A. Yes, I kept notes of my work while I was in New York in the regular laboratory notebooks, into which were written the results of work and experiments by Mr. Logwood and myself. These books remained in the general laboratory of the DeForest Company and were, so far as I know, in their possession when the studio—or, the works the laboratory were moved from High Bridge to Jersey City, which was in the early spring of 1922. I left High Bridge to carry on my development of the talking motion picture in Germany in October, 1921, and was abroad at the time the factory was moved to Jersey City. These notebooks—I have never been able to find these early notebooks since the plant was moved over to Jersey City. A great number of records of the office and laboratory were lost or destroyed during that moving."

Now, what is your present recollection as to whether that notebook was destroyed in the fire or not?

[fol. 36] A. Since giving the testimony which you have just read, my memory has been refreshed by the testimony of Coyer and Garity, and my present recollection is that the notebook which I was keeping—in which I was keeping the record of my early work prior to my work in the studio—in the office building located at 1415 Sedgwick Avenue—was destroyed in the fire.

X Q. 47. You say your memory was refreshed by Coyer's deposition?

A. Yes, by the deposition of Henry Coyer.

X Q. 48. When did you read Coyer's deposition?

A. Not until some time after it was completed—typed. I was not present when Coyer was testifying most of the time.

X Q. 49. Were you present when he was testifying?

A. I was present when he began his testimony, but, as I recall it now, only for a half hour or so.

X Q. 50. By your statement in answer to Q. 14 of your present testimony, to the effect that about three-quarters of your time was devoted to the "phonofilm problems," you were referring to the trials of the different light sources under various conditions for getting sound photographed on a film?

A. Yes, in general. That was part of the general phonofilm problem at which I was at work during that period.

X Q. 51. You were not intending to give the impression that three-quarters of your work during this period was endeavoring to take sound record and picture record on separate films and then print them on a third?

A. Oh, no, not at all. I didn't begin to take pictures until I purchased the camera from Herbert & Huesgen in February, 1921.

[fol. 37] X Q. 52. I have read through your notebook No. II, and as far as I can ascertain therefrom that notebook is concerned with experiments endeavoring to photograph sound by a gas flame, except for a few days' work in March, 1921—I believe about March 10th to about March 18th—when you were using in experiments what you referred to as the photion tube; is that substantially correct?

A. The notes in that book between the dates you have cited refer, as you have stated, to an experiment with the photion or gas-filled tube as a source of light. I carried on experiments at earlier dates than above with the photion, which I originally called "luxion."

X Q. 53. But in that notebook, Exhibit No. 1, the experiments outside of those dates that I referred to appear to be carried on merely with photographing sound with a gas flame.

A. Yes; I do not find any reference in this book to other tests with the photion tube.

X Q. 54. And in that book, as far as I could ascertain, there are only two entries—namely, those under date of December 28, 1920, and January 18, 1921—which make any reference or suggestion to the use of two separate films for recording sound and pictures; is that correct?

A. Yes; those are the two references to the use of two films, one for recording sound and one for the picture.

X Q. 55. Now, did you read your patent application before you signed it?

A. Yes.

X Q. 56. Did you consider in reading it that it correctly set forth your invention with respect to the use of two separate films for recording sound and pictures and the print- [fol. 38] ing of the sound record on the same film with the picture record?

A. Yes, I read the specification at the time it was prepared. I do not believe I was particularly—thoroughly satisfied with it—which is frequently my condition when I receive patent specifications from my attorney which I do not draw up myself.

X Q. 57. In what way do you recall you were not satisfied with it?

A. It was too brief, as I recall it. It did not go into the subject as thoroughly as I should have liked to have had it.

X Q. 58. Did you consider that it at least pointed out in general the problem which you were seeking to solve?

A. At this late date I have no recollection of just how I was impressed by reading the specification in 1921.

X Q. 59. Well, would you have accepted as satisfactory an application specification which made no reference whatsoever to the object of your invention or the problem you were seeking to solve by that invention?

A. It was my opinion, as I recall it now, that the claims covered the invention and, if issued, would give me the protection that I was after.

By Mr. Ward: The answer is objected to as unresponsive.

X Q. 60. I asked you whether you would accept as satisfactory a specification of yours which made no reference to the object of the invention or the problem that the invention sought to overcome.

A. In general, no.

X Q. 61. You have testified here that you had found, after [fol. 39] developing your sound records, that you would have to overdevelop the film in order to get a proper sound record and that you realized that this necessary overdevelopment of the sound record would fog a picture record if it was sought to take both on the same film and develop the combined record as found on that film, and that it was for this reason that you conceived of the idea of taking the picture record and the sound record on separate films and then reprinting from these on a third film; is that correct?

A. That is correct.

X Q. 62. Now, I will ask you to take your patent specification and look through it and see if you find a word anywhere in it with reference to that problem?

By Mr. Darby: The question is objected to because it calls for the construction of the patent and patent language by this witness. The patent will speak for itself, and the counts of the present interference of themselves answer the question.

I further object to the question on the ground that it is not proper cross examination, and call attention to the fact that opposing counsel is making the witness his own witness.

By Mr. Ward: Counsel believes he has a right to cross examine the witness in an endeavor to have him clear up, if he can, what counsel believes is an obvious inconsistency between the disclosure of the patent specification and the witness' alleged conception, or rather a total absence in the specification, as counsel sees it, of anything pertaining to [fol. 40] what the witness now alleges he had in his mind in December, 1920, and January, 1921, but which is the subject-matter and is fully disclosed in his opponents' specification.

By Mr. Darby: Opposing counsel's statement consists of nothing more nor less than an argument based on documentary record, which argument can be successfully or unsuccessfully presented on that documentary record before the proper tribunal without requiring this witness, who, so far as this record is concerned, is unqualified to give a legal construction of the patent, for, obviously, the patent will speak for itself. If, however, counsel insists on answer to this question, which likewise obviously is directed to matter not gone into on direct examination, I adhere to the rules of evidence and will urge that the witness has been made his own and he will be bound thereby.

By Mr. Ward: Counsel insists that he has a right through cross examination to point out the improbability of the statements made by the witness, particularly in view of the character of the said two items appearing in the notebook; and if this witness is not the proper one to cross examine on it, counsel does not know who is.

By Mr. Darby: Mr. Ward's right to impeach this or any other witness in this or any other proceeding is in no sense questioned. The method and subject-matter of his endeavor to do so, however, must conform to the rules of

[fol. 41] evidence. Further argument on the question, however, will be reserved for the proper tribunal; and the witness is instructed to answer the question to the best of his ability if an answer is insisted upon.

A. This patent specification does not set forth the fact that the picture negative and the sound negative may advantageously or necessarily be developed to different degrees of development, but the idea of printing separately from the sound negative and also from the picture negative on the same positive is very clearly expressed and covered in the claims.

X Q. 63. And as you read the specification and understand it, the object of doing it is to get the advantage of taking the sound record originally on a larger scale and then reducing that scale when reprinting on the combined picture and sound film?

A. That is the advantage of this method which is set forth in the specification, but it is not the only advantage.

X Q. 64. Now, with respect to your notebook marked "III," Exhibit No. 2, I do not understand that there are any entries in that notebook pertaining to the subject-matter of the invention here at issue. By that I mean the taking of sound and picture records on separate films and printing on a third film therefrom.

A. That is correct.

X Q. 65. From your experience, what is the maximum time that the picture record can be developed without fogging it?

[fol. 42] A. Well, that all depends on the brightness of the light on the object, the type of film used, and the type or degree of concentration of the developing solution.

X. Q. 66. Well, as a general proposition, can you develop the film up to 3½ to 4 minutes without fogging it?

A. Yes, usually can.

X Q. 67. Can it be developed up to 5 minutes without fogging it?

A. Yes; in certain developers it can be developed 10 minutes without fogging. Others developers would fog that same film in two or three minutes.

X Q. 68. You have made reference to the Mees developer —as I understand it, that being a developer that was recommended to you by Dr. Mees; and with that particular devel-

oper about how long could you develop a motion picture film without fogging it?

A. My recollection is that the note refers to film I sent to Rochester and was developed there by Dr. Mees. (The witness consults notebook.) The film that you referred to was actually sent to Dr. Mees at Eastman's in Rochester, and was developed there by him. The note makes no statement as to how long it was developed by Dr. Mees, but states that it was developed by him until it was quite fogged—too much for a picture film.

X Q. 69. Well, you are referring to a particular item under date of April 6, 1921. I am asking you as a general proposition from your experience with this Mees developer, which, from your notebooks, I have observed that you had subsequently used; and I ask you, from your experience [fol. 43] with that developer, how long did you find that a picture film could be developed without fogging it?

A. I find a reference under date of May 10, 1921, that I developed a film in the new (Mees) developer for 4 minutes. I take it that this was about the time that was recommended by Dr. Mees for developing the film in his developer, although the notes do not make reference to any such instructions.

X Q. 70. Do you remember approximately how long a picture film could be developed in the Mees developer without fogging it?

A. No, at this date I cannot. I find another reference under date of May 16, 1921:

"Developed 5 minutes but in *diluted* developer Mees type."

So I should infer that Mees' developer had to be diluted in order to permit even 5 minutes' immersion without fogging the film.

X Q. 71. That notebook that you are reading from, Exhibit No. 2, is entitled, is it not, "Films with Motion Picture Camera"?

A. Yes.

X Q. 72. That means that those films referred to in that notebook were films on which you took the sound on record run through your motion picture camera?

A. Yes.

X Q. 73. Or does it mean that you took the sound and also pictures?

A. My first work with this motion picture camera was recording sound alone. Then, later on, I photographed picture at the same time.

[fol. 44] X Q. 74. How long from the time you purchased the camera—which has been testified to as being February 18, 1921, did you continue to photograph sound alone and not pictures and sound? In other words, how long after the purchase of the camera did you start to photograph pictures and sound?

A. It was several weeks after I got the camera before I had the necessary attachment placed on same for recording sound on the same film with the picture.

Cross-examination closed.

Deposition closed.

(Signed) Lee DeForest.

Subscribed and sworn to before me this 6th day of February, 1928.

(Signed) Augusta P. Boos, (Seal.) Notary Public, Queens Co. No. 2011. Certificate filed New York Co. No. 1109. New York County Register's No. —. Commission Expires March 30, 1929.

DEPOSITION OF STEPHEN J. TORMA.

STEPHEN J. TORMA, called as a witness in behalf of the Party DeForest, having been first duly sworn, testifies as follows, in response to questions by Mr. Darby:

Direct examination.

By Mr. Darby:

Q. 1. Please state your full name; age; residence; and occupation.

A. Stephen J. Torma; 28; 109-04 108th Street, Richmond Hill, New York; occupation, salesman—photographic salesman.

[fol. 45] Q. 2. By whom are you employed?

A. Herbert & Huesgen Company.

Q. 3. How long you been employed by that company?

A. Twelve and a half years.

Q. 4. In 1920 and 1921, who was your superior in Herbert & Huesgen in your department?

A. In that particular department, Mr. A. J. Senner.

Q. 5. Did you during that period know or have any dealings with Dr. Lee DeForest?

A. Indirectly, Mr. Senner being in charge. He was the only salesman we had back there, my being more or less of an order clerk at that time and making out different orders given me by Mr. Senner; and, of course, I assisted—when we got a little busy, I assisted in selling; but I wasn't a full-fledged salesman at that time—I wasn't recognized as such, but I did assist quite some.

Q. 6. Is Mr. Senner still with Herbert & Huesgen Company?

A. No, he left the employ in November—the latter part of November, 1927.

Q. 7. Do you know of your own knowledge what was the nature of the dealings had by Dr. DeForest with Herbert & Huesgen?

A. Yes; I understand he was working on some talking moving pictures.

By Mr. Ward: Objected to as hearsay.

Q. 8. What were the dealings that Dr. DeForest had?

A. He had purchased films; had them developed.

Q. 9. Did Herbert & Huesgen develop films for him?

A. We did.

[fol. 46] Q. 10. You know that of your own knowledge?

A. I do.

Q. 11. And Dr. DeForest purchased films from Herbert & Huesgen?

A. Yes, sir.

Q. 12. You know that of your own knowledge?

A. I do.

Q. 13. Did you assist in any way in the transaction for Herbert & Huesgen?

A. As I say, indirectly, as I was under Mr. Senner. Mr. Senner had direct dealings with Dr. DeForest for the company, and I being there was, too, very, very much interested in what was going on. I took care of making out the necessary orders that were submitted to me in order to complete the transaction.

Q. 14. Did you ever see any of the film?

A. I did.

Q. 15. What was the appearance of it?

A. I recall seeing a film with lines on it. At that time I understood those lines were really voice recorded on the film.

By Mr. Ward: Objected to as hearsay.

Q. 16. Over what period of time were these transactions carried on?

A. Well, I recall from some part of—not quite the latter part of 1920 to about the middle of 1921.

Q. 17. And about the middle of 1921 were the transactions stopped? Did Dr. DeForest stop coming back?

A. Yes; as I understood, I think he was going abroad; in fact, he did go abroad, because when he came back he told us he had been over there; we missed him for quite a while. [fol. 47] Q. 18. And how frequently during that period, to your knowledge, was Dr. DeForest ordering either work done or equipment from Herbert & Huesgen?

A. Oh, approximately once or twice a week in small ways; sometimes in pretty large, especially when he bought the camera.

Q. 19. He bought a camera from Herbert & Huesgen before he went to Europe, did he?

A. Yes, sir.

Q. 20. Were you familiar with that transaction?

A. I was, very much.

Q. 21. And from your knowledge, was Dr. DeForest's activity with Herbert & Huesgen greater or less after he bought the camera?

A. It seems as though he was more active after he bought the camera, because he had more equipment to play with; in fact, he was anxious to see how this particular camera would work.

Q. 22. Did he buy more film after he bought the camera?

A. Yes, he was.

Q. 23. Did you do more developing for Dr. DeForest after he bought that camera?

By Mr. Ward: Objected to as grossly leading.

A. I believe so.

Q. 24. That is your recollection?

A. Yes, sir.

Direct examination closed.

Cross-examination.

By Mr. Ward:

X Q. 25. How old were you in January, 1920?

A. Going on my 21st birthday—Oh, in January, 1920, I was going toward my 20th birthday.

[fol. 48] X Q. 26. Where is Mr. Senner now?

A. Well, as I understand, he is home, 33 Sutton Place.

X Q. 27. You say that during this time you saw Dr. DeForest bring in film with lines on it?

A. Yes, sir.

X Q. 28. What kind of lines?

A. Oh, very faint lines; of course, very hard to describe; in a way they vanish at times.

X Q. 29. Where were these lines placed on the film?

A. My recollection, I think it is right towards the edge of the film.

X Q. 30. Do you know or are you guessing?

A. I'm not sure; towards the edge of the film—I know it wasn't in the center; whether left side or right side, I can't remember.

X Q. 31. What, if anything else, was on the film?

A. I don't remember seeing anything else.

X Q. 32. Now, did you make any notes or have any memorandum as to these transactions?

A. No; at that time I was just interested in an offhand way. Being that I was more or less an understudy, I wasn't very much interested, because I didn't think it would do me any good, anyhow. Mr. Senner, I believe, was very much interested, and he, of course, knows more than I do.

X Q. 33. And all you know about the matter is that you saw film, which Dr. DeForest either brought or sent there, with lines on it?

A. Yes, sir.

X Q. 34. And how are you able with any certainty to fix the dates you have given as commencing about the latter part of 1920?

A. Well, I remember it was some time before Dr. DeFor-[fol. 49] est bought the camera from us. He had been playing with something else—whether it was a camera he had borrowed or owned previous to that, I don't know; but he had been playing with films along those lines, and then he bought the camera and continued with his experiments.

X Q. 35. What is the date on which he bought the camera?

A. February 18, 1921. I looked up those records not long ago just to refresh my memory.

X Q. 36. Did you know if prior to that he was playing with films of the same kind?

A. Yes, experimenting on this talking film.

X Q. 37. How do you know it was talking film?

A. I was made to understand it at that time.

X Q. 38. You don't know it was talking film, though?

A. I haven't actually seen it work, but I have known that it was those lines Doctor was working on.

X Q. 39. You were told that?

A. No, I overheard different talks between Mr. Senner and Dr. DeForest at that time, and from their talks I knew that it was talking film they were working on.

X Q. 40. And how do you know that he brought these films in up to about the middle of 1921?

A. Well, it was pretty near a year from the first time Doctor came in with his first experiments until about the last time; I should judge between 10 and 12 months. In all that time he was bringing in films.

X Q. 41. Are you able to positively swear now that he was bringing in film in July, 1921?

A. I wouldn't say July, but some time the latter part of 1920.

[fol. 50] X Q. 42. Are you able to positively swear now that he was bringing in film in June, 1920?

A. No, I can't say.

X Q. 43. Are you able to positively swear now that he was bringing in film in June, 1921?

A. June, 1921? No, I wouldn't swear to that, either. I know it was around the latter part of 1920 and the early part of 1921.

X Q. 44. Would you be willing to swear positively from your knowledge that he brought in films of that character that you have testified about, in April, 1921?

A. Oh, no—April, 1921? Yes, because the Doctor bought the camera in February and was playing with it at least three or four months after.

X Q. 45. How do you know it was in April as distinguished from February or March?

A. I have no record to refer to, but I am quite certain.

X Q. 46. In other words, the best you can say under oath is that during some time between January, 1921, and the

end of 1921, Dr. DeForest brought some film in of the character you have described?

A. From about—not the end of 1921, no.

X Q. 47. Up to when?

A. Up to about two or three months after he bought the camera—February, March, April—just about two or three months after. Later, I believe, the Doctor sailed or had plans of going to Europe and went; and we haven't seen him after that for about a year, I guess.

X Q. 48. That is all you know about the situation?

A. That is as much as I can remember.

X Q. 49. And you were a boy of about nineteen at that time?

[fol. 51] A. That's right.

X Q. 50. And are testifying entirely from memory over a period of about seven years; is that right?

A. Between seven and eight years.

Cross-examination closed.

Redirect examination.

By Mr. Darby:

R. D. Q. 51. You referred, in your cross examination, to having recently looked up when Dr. DeForest purchased the camera. You did that at Dr. DeForest's request, did you not?

A. I did.

R. D. Q. 52. And you made a written memorandum of the record of the purchase?

A. We did. I made a memorar lum myself, and then the records are still at Herbert & Huesgen of the original date of purchase.

R. D. Q. 53. And you made a memorandum which you copied from the record and gave that memorandum to Dr. DeForest?

A. I did—no, I had it made up for me by one of the office boys.

R. D. Q. 54. Is that the memorandum you gave Dr. DeForest?

(Counsel hands memorandum to witness.)

A. I did. That is made out by the man who makes the camera sales. I phoned up for it.

R. D. Q. 55. And do you know whether everything on that memorandum was taken from the records of Herbert & Huesgen?

A. At that time the Doctor bought other materials which were not entered, such as films and accessories we do not keep a record of—those records are thrown out every so [fol. 52] many years; but camera sales they try to keep as long as they can, because they have a serial number.

R. D. Q. 56. My question is whether everything on that written memorandum you gave Dr. DeForest was copied from the records of Herbert & Huesgen.

A. Exactly.

R. D. Q. 57. What is the date, February 18, 1921? Is that the date of purchase?

A. That's the date of purchase, yes, sir; but the camera was charged to the DeForest Radio Tel. Co.—right there (witness indicates on memorandum).

R. D. Q. 58. And what was the name?

A. Ernemann Model A Motion Picture Camera.

R. D. Q. 59. Was that given a number?

A. Serial Number 732021.

R. D. Q. 60. And what is that next line (indicating on memorandum)?

A. That's the lens that was fitted on that camera—Carl Zeiss Tessar.

R. D. Q. 61. And was the lens given a number?

A. Yes, sir—271112.

R. D. Q. 62. And was the $330 the purchase price of the camera?

A. The camera at that time listed for $300, and I believe the additional $30 is for the better lens.

By Mr. Darby: I offer in evidence the memorandum referred to; and ask that the same be marked, "DeForest Exhibit No. 3."

By Mr. Ward: Objected to as not proven, as this witness has stated either on or off the record that he did not make that memorandum, but, as I understood, that he phoned up and had some one make it for him.

[fol. 53] R. D. Q. 63. Did you compare the memorandum with the original record in Herbert & Huesgen's?

A. I didn't, because the man who makes our entries has no reason to put in any other serial numbers or make any irregular entry on the copy.

R. D. Q. 64. What was the name of the man who made the memorandum?

A. Mr. Cruset.

R. D. Q. 65. To clear up the matter, I will put another question. You actually saw the DeForest record, did you not?

A. At the time of purchase, yes.

R. D. Q. 66. But you haven't seen it since?

A. No.

R. D. Q. 67. I am going to ask you, during the noon adjournment, to personally compare this record, which is marked DeForest Exhibit No. 3, with the original record at Herbert & Huesgen Company, so as to enable you to state whether or not this memorandum is accurate and complete as to the purchase of the camera.

A. I will do that.

R. D. Q. 68. You have referred to seeing the lines on the films that Dr. DeForest brought to Herbert & Huesgen?

A. Yes.

R. D. Q. 69. Were those lines on the film that Dr. DeForest brought, or were they on the film after Herbert & Huesgen had developed the film?

A. Well, I have seen them both ways, if my memory is right. I remember we developed some and they looked like nothing to me—ordinarily we expect to see pictures on film. Then there were times when Doctor brought in films—whether there was a picture on it or not I can't really remember.

[fol. 54] R. D. Q. 70. I am not so much concerned with the picture as I am with these lines you have referred to, and what I am trying to bring out is that you never examined the films before they were developed, did you?

A. You couldn't, you would ruin them.

R. D. Q. 71. Have you ever testified in court or in any court proceeding of this nature before?

A. Never.

R. D. Q. 72. And you, of course, are not interested one way or the other as to the outcome of this proceeding?

A. Not in the least. In fact, I am losing a lot of time now when I could be making money.

Redirect examination closed.

Recross-examination.

By Mr. Ward:

R. X Q. 73. Was this camera which was purchased a motion picture camera?

A. Yes, sir.

R. X Q. 74. Did you say that prior to this DeForest had any camera?

A. Whether he had or not I never seen it. He must have used something in the way of a moving picture camera to do what he did.

R. X Q. 75. You said he was playing around with motion pictures, didn't you?

A. It must have been a moving picture camera because film won't run through anything else I can think of.

R. X Q. 76. Do you remember when the DeForest factory or laboratory, or whatever it was, at High Bridge burnt?

A. No, that's news to me; I didn't know they had a fire.

[fol. 55] R. X Q. 77. You didn't know they had a fire there?

A. No.

R. X Q. 78. Are you a graduate of any school or institution?

A. No.

R. X Q. 79. Do you recall on what day Lincoln's Birthday falls?

A. February 22nd—February 12th, pardon me.

R. X Q. 80. When did you go with this Company?

A. I can tell you right to the date, July 13th, 1915.

R. X Q. 81. And are you still with them?

A. Yes, sir; $4 a week at that time.

Recross-examination closed.

Re-redirect examination.

By Mr. Darby:

R-R. D. Q. 82. Were you ever up to the DeForest factory on Sedgwick Avenue?

A. Never, no.

R-R. D. Q. 83. Do you know where it is?

A. I can find it, Sedgwick Avenue, yes. It's up in the High Bridge section.

Re-redirect examination closed.
No re-recross examination.
Deposition closed.

Signature of the witness waived by consent of counsel.

STIPULATION

It is stipulated that if Stephen J. Torma was recalled to testify concerning the data contained on DeForest Exhibit No. 3, he would testify that the data thereon contained [fol. 56] is accurately transcribed from the record of Herbert & Huesgen, and that he had examined the record and found that to be the case.

By Mr. Darby: I am advised by Mr. Torma that the original record from which DeForest Exhibit No. 3 was copied is at the office of Herbert & Huesgen, 18 East 42nd Street, New York, N. Y., and is available to inspection by opposing counsel at any time within business hours, the record being in a large book forming part of the permanent records of Herbert & Huesgen.

DEPOSITION OF WILLIAM E. GARITY

WILLIAM E. GARITY, called as a witness in behalf of the Party DeForest, having been first duly sworn, testifies as follows, in response to questions by Mr. Darby:

Direct examination.

By Mr. Darby:

Q. 1. Please state your name, age, residence and occupation.

A. William E. Garity, 439 Bainbridge Street, Brooklyn, age, 28, occupation, engineer.

Q. 2. By whom are you employed?

A. At present time I am a free lance.

Q 3. By whom were you employed in 1920 and 1921?

A. DeForest Radio Tel. & Tel. Company.

Q 4. While so employed did you have anything to do with talking motion picture problems?

A. I assisted Dr. DeForest in all his experimental work.

Q. 5. Where?

A. At Sedgwick Avenue, at the DeForest plant.

[fol. 57] Q. 6. Were any records kept of the experimental work that Dr. DeForest did?

A. The Doctor kept his records of his experiments in a series of stenographers' notebooks.

Q. 7. Did you have occasion to inspect those notebooks during those experimental periods?

A. They were on hand at all times. I could read them and read the records of experiments made.

Q. 8. Did you conduct any experimental work under the direction of Dr. DeForest on talking motion pictures?

A. In that way, no. I worked with the Doctor. I made no independent researches; I worked with him entirely.

Q. 9. Did you do any work, the results of which, you know of your own knowledge from your inspection of the notebooks, were recorded in the notebooks?

A. The results? I will put it this way: The Doctor used to use my voice as a check against his in recording the film, so he could check the difference in quality, and for defects produced by natural reproduction; and all such records of those tests were recorded in those notebooks.

Q. 10. And what method, if any, was employed by Dr. DeForest, to your knowledge, in making records in the notebook?

A. Why, generally, the experiment to be conducted was the notation that was made in pencil, and the results of the experiment noted in ink.

Q. 11. Then, as I understand it, as a general method there would be an entry of an experiment before it was actually conducted?

A. Yes; an idea would be had and a note would be made in pencil and space left for the results: there might be two [fol. 58] or three subjects noted before any tests were made or any experiments conducted on those subjects. One experiment might suggest several, and notes would be made on that, tests to be made in the future.

Q. 12. How long after an experiment was outlined in the notebook was it customary to record the results?

A. At the earliest possible moment. It might be a day or two days after the idea, so as to make a continuous run of experiments on the work; and it might be that one idea might be two days before you could work it out—two days later.

Q. 13. You are familiar with patent claims, are you?

A. Yes.

Q. 14. Accepting my statement that the subject-matter here in controversy has to do, in part at least, with making separate records of sound and picture for talking motion pictures, was that a subject that you at any time in 1920 or 1921 were conversant with?

A. In this way: We had always found—it seemed to work out that the technique of handling film for voice would be radically different from that for a satisfactory picture, and it suggested itself at that time, when we first realized that at some future time provisions would have to be made for handling the development—that is, the developing of the voice record would have to be separate from the developing of the picture.

Q. 15. Why was that?

A. Because the voice record—the good voice records that we got—required overdark exposure, which would usually be so dark it would prohibit the use of that particular type [fol. 59] of developer to be used on the picture—you wouldn't get anything on the screen—it would practically fog the film.

Q. 16. What is meant by fogging the film?

A. Fogging is where you get beyond the optimum point of developing and start—and cause a reaction to take place in your basic silver solutions that haven't already been acted upon by the photograph.

Q. 17. Did you keep conversant with the progress that Dr. DeForest was making in his work on talking motion pictures?

A. Yes; my laboratory was in the same room with the Doctor.

Q. 18. Did you keep conversant with the results that Dr. DeForest was recording in his notebooks?

A. I read every record that he made at that time.

Q. 19. And did you keep abreast of the entries in the notebooks?

A. Yes.

Q. 20. Did Dr. DeForest ever tell you of any plan that he had in mind for getting over this difficulty that you have described?

A. He stated the necessity of handling the two films, that is, the voice and the picture, differently; and at some time sooner or later, when the opportunity presented itself, he

would develop the necessary mechanical apparatus to develop first the picture and then the voice and then superimpose the two on a single negative, from which we would make the positives. The actual mechanical work wasn't done at that time, because there was no necessity for it.

Q. 21. Do you recall when Dr. DeForest made this disclosure to you and if, to your recollection, he made any record of such a solution?

[fol. 60] By Mr. Ward: Question objected to as vague and indefinite, and as not defining what is meant by the disclosure.

A. I can't state any definite time, because all during that period we realized the necessity of it, and as I recall, Doctor made some notes as to method of developing mechanical technique for taking two records and producing a single film from them. I say "two records"; I mean by that one voice record and the picture.

Q. 22. Can you give any definite time before which you are certain you discussed this matter with Dr. DeForest?

A. Well, I would place the first time we talked about it around the holidays in 1920.

By Mr. Ward: Objected to as contrary to the preliminary statement.

Q. 23. I call your attention to DeForest Notebook No. II, which is marked here in evidence as DeForest Exhibit No. 1, which has entry dated December 26th; and I call your attention to the entry at the bottom of the page in pencil, and will ask you if you ever saw that entry before; if so, when for the first time?

A. Well, I would say I saw it either the same day or within the second or third day following—right at the time, because I was conversant with the notebooks at all times.

Q. 24. Are you familiar with the subject-matter of the entry?

A. Yes.

Q. 25. Do you recognize that notebook?

A. I do.

Q. 26. Is that one of the—

[fol. 61] A. (Interrupting:) This is the type of book that was used.

Q. 27. Do you recognize that as one of the notebooks in which Dr. DeForest kept all the work he was doing on talking motion picture work in 1920 and 1921?

A. I do.

Q. 28. I call your attention to the entry at the bottom of page which is marked "2" in red pencil; and ask you if you can positively state that you saw that entry on or about the date thereof?

By Mr. Ward: Objected to as leading.

A. Yes.

Q. 29. Have you a definite recollection of discussing the subject-matter of that entry with Dr. DeForest?

By Mr. Ward: Objected to as leading.

A. Not this particular entry. I have no particular recollection of this definitely.

Q. 30. Have you a definite recollection of discussing with Dr. DeForest on or about that time the subject-matter of the entry?

By Mr. Ward: Objected to as leading.

A. This subject-matter was discussed continuously on and off throughout that period. I cannot name any one particular time on which we discussed it.

Q. 31. I call your attention to the entry at the bottom of page marked "3" in red pencel; and ask you if you can recall having read that entry on or about the date thereof.

By Mr. Ward: Objected to as leading.

A. Yes.

[fol. 62] Q. 32. And have you a definite recollection of having discussed the subject-matter to which that entry is directed with Dr. DeForest on or about that period?

By Mr. Ward: Same objection.

A. I would give you the same answer as on the other question.

Q. 33. I call your attention to the last entry in the book, on page marked "4" in red pencil. Do you recall having read that entry on or about the date thereof?

By Mr. Ward: Same objection.

A. I do.

Q. 34. I ask you to examine DeForest Notebook No. III, which is marked DeForest Exhibit No. 2 in this case; and ask you if you can identify that notebook as one of the notebooks of Dr. DeForest with which you are familiar and kept by the Doctor at that time.

A. I can; I do.

Q. 35. Am I correct in understanding that your laboratory was in the same room with Dr. DeForest?

A. Yes, sir.

Q. 36. During that period?

A. Yes, sir.

Q. 37. What proportion of Dr. DeForest's time, from your observation, was he devoting to phonofilm problems during that period?

By Mr. Ward: Question objected to as vague and indefinite.

A. That was his entire work outside of a few moments he might spend in administration—that was required for [fol. 63] the administrating of the radio work; his entire research work was devoted to phonofilm.

Q. 38. And how long did his application to phonofilm work last, as near as you can recall?

By Mr. Ward: Same objection.

A. Lasted until he went to Europe at that time; and he continued his work in Europe.

Q. 39. About when, according to your recollection, did Dr. DeForest go to Europe?

A. Some time in the summer of 1921.

Direct examination closed.

Cross-examination.

By Mr. Ward:

X Q. 40. Why is it that you were able to identify the entry on the last page of notebook, Exhibit No. 1, notebook marked No. II, the page of the entry being marked "4" in red pencil, as of the date of April 6th under which it appears, and yet you were unable to identify the other entries, as I understood you, as of the dates under which they appear?

A. I don't think I identified them exactly as to date. I can't do that. I can testify to the record—the running record. I was conversant with that record when made, but to say that a particular record 2 or 3 or 4 was made on a certain date, I can't testify to that. My memory doesn't go back that far.

X Q. 41. In other words, what you know about this notebook is that Dr. DeForest was keeping a notebook of this character in 1921 and 1922, making entries in it, and that you were in a general way conversant with the notebook at that time?

A. Exactly.

[fol. 64] X Q. 42. But you can't swear that any one of these particular entries are now exactly in the form in which they were entered by Dr. DeForest?

A. I would. Yes, I would say that; that is, the subject-matter in these notebooks covers that general period.

X Q. 43. I didn't ask you that. I asked you: Could you state now that this writing in these entries is exactly what it was when it was made?

A. Yes.

X Q. 44. How can you make that statement?

A. Well, due to the fact that I am conversant with the entire book in general. I know that was the subject-matter covered at the time.

X Q. 45. Well, is your memory sufficiently good to memorize these entries?

A. No, I can't memorize the entries.

X Q. 46. You couldn't undertake to tell me what is on a page I show you without reading it?

A. No, not without reading it. I can tell you in general what the notebook covers from start to finish.

X Q. 47. And while you know that Dr. DeForest was making experiments on photographing sound during this period and keeping a notebook of this character, you can't state that the particular entries to which you have been directed were made on the particular dates under which they appear?

A. Not to definitely state the exact time to the day.

X Q. 48. Did you make any entries in this notebook yourself?

A. I did not.

X Q. 49. You made some reference to the fact that the proposed experiments were usually written in pencil and

[fol. 65] the results in ink as a general proposition, didn't you?

A. That is my recollection.

X Q. 50. Doesn't it appear to you that the reverse seems to be true in most of these pages?

A. It does in that book.

X Q. 51. As I understand your testimony, all the experiments pertaining to the phonofilm matters that were conducted during the period covered by this book, Exhibit No. 1, October 15, 1920, to April 6, 1921, were recorded in this book?

A. Yes.

X Q. 52. And as I understand your testimony, during the period covered by this book, at the time therein, Dr. DeForest was engaged in developing films having sound records thereon; and that he stated that later on, when occasion arose, he intended to take the picture film and sound film separately and superimpose or photograph the two on another film?

A. In general. Let me answer that: The records that the Doctor made were purely sound records. He would run as many as eight records on a single strip of film. The voice records weren't good, and we had to first develop the technique of making a sound record on the film. The matter of timing it in with the picture was understood; it could be done; that is, using a sound camera and a motion picture camera for talking motion pictures was only a matter of mechanical convenience of connecting the two cameras on the same drive shaft to get synchronization; so it wouldn't be necessary.

X Q. 53. And he intended to do that later on?

A. There was absolutely no use doing it then. That [fol. 66] would be unnecessary expense, and it was concededly so simple there wasn't any use buying a camera to take pictures when we didn't have a sound record to begin with.

X Q. 54. When you didn't have what to begin with?

A. Didn't have a decent sound record, let me qualify it.

X Q. 55. And that photographing of the pictures and sound on separate records and then reprinting from those on single records was not tried out?

A. It was not. It was conceded it was so simple it wasn't necessary going to the expense.

By Mr. Ward: The last part of the answer is objected to as volunteered and not responsive.

X Q. 56. You say it was a simple matter to mechanically connect up the two cameras, one with a sound record and one with a picture record, to run them synchronously. How much of a job do you think that would have been?

A. It just requires placing of a sound camera and a moving picture camera adjacent to one another and connecting them mechanically by a solid shaft—I won't say solid shaft—a shaft with a flexible coupling—to allow for mechanical play, and drive either one with the other. Both machines would run the same footage, and as a result you would have the same amount of film and picture taken at the same time.

X Q. 57. Is that much of a job, to connect the two together?

A. It isn't any job.

X Q. 58. What do you think it would cost?

[fol. 67] A. It would first cost—the actual connection wouldn't amount to much—a mechanic could do it in a day—but the primary cost is the purchase of a moving picture camera, which runs into two or three thousand dollars.

X Q. 59. Dr. DeForest bought a motion picture camera, the testimony here shows, for $330. Did he have any motion picture camera prior to February, 1921?

A. No, sir; not to my recollection.

X Q. 60. With what was he taking motion picture sound film records prior to February, 1921?

A. With what we term now a "sound camera"—purely a device to record sound.

X Q. 61. Did it have sprocket wheels?

A. It had sprocket wheels—everything necessary to drive the film and just record sound alone.

X Q. 62. Could that have been connected up with a motion picture camera synchronously?

A. Provided, in that case, the sound camera would have to be placed in an adjacent room and the drive shaft placed through the adjacent wall, the sound camera in one room and the motion picture camera in the other room, in order to preserve a light-proof condition on the sound camera. It wasn't manufactured and made to be worked in the open air; it had to have a dark room.

X Q. 63. But that sound camera, as I understand you, could be connected up synchronously with a motion picture camera?

A. By means of a shaft and gears.

X Q. 64. And the work entailed the time of a mechanic for about a day or two?

A. Yes.

X Q. 65. And that was not done up to when?

[fol. 68] A. It was never done in my experience here with the DeForest Radio.

X Q. 66. And you were there for how long?

A. For five years.

X Q. 67. You were there from the latter part of 1920?

A. 1919.

X Q. 68. Up until when?

A. 1924.

X Q. 69. And these various records that this notebook refers to as films having sound records thereon are simply films with sound records on them without picture records?

A. At that time. We subsequently made pictures.

X Q. 70. And those various experiments that were conducted during this time to determine the proper density of record of sound on these films were necessary in order to carry out Dr. DeForest's inventions with respect to recording sound on film, were they not?

A. Exactly. The making of pictures was a foreign field, and was already well covered, and there was no necessity of trying to improve on that.

X Q. 71. The prime thing that he was working on during the period covered by these notebooks was the problem, as I understand it, of merely recording sound on film properly?

A. Developing the technique of recording sound.

X Q. 72. And later on it was his intention to get at the idea of adapting this to talking movies by taking the sound record and picture record and printing them on a single film?

A. Yes.

X Q. 73. When was the fire at High Bridge?

[fol. 69] A. The latter part of 1921, I recall.

X Q. 74. Do you remember in what month?

A. I think it was in September or November—somewheres in the fall; we had just finished inventory; that is generally taken in the fall.

X Q. 75. Did the whole factory burn down?

A. Well, it burned practically—wrecked the entire plant.

X Q. 76. Where were these notebooks kept prior to that time?

A. We have an office building, 1391 Sedgwick Avenue—I won't be sure of the address—a separate building aside from the factory.

X Q. 77. Then, if anyone else has testified that in that fire all of Dr. DeForest's notebooks pertaining to experiments were destroyed, that would be untrue?

A. Notebooks as far as phonofilm, yes.

X Q. 78. The phonofilm notebooks were all preserved—saved?

A. The main manufacturing plant, containing all manufacturing units, including the vacuum tube division, was at 1391 Sedgwick Avenue. Dr. DeForest and my own laboratory was located at 1415—and both these addresses are subject to question as to the exact number—in a two-story building, of which the upper floor was used as the office of the radio plant. All phonofilm experiments as to film recording and reproducing were carried on at 1415 Sedgwick Avenue. The manufacturing and mechanical work done for phonofilm, along with all other developments of the plant, were done at 1391.

X Q. 79. Which burnt down?

A. 1391 burnt.

[fol. 70] X Q. 80. So that the building in which all of the phonofilm experiments were made was not burnt?

A. Exactly.

X Q. 81. And all the records in that building were not destroyed?

A. Not a thing. It was 800 feet from the other plant.

X Q. 82. No chance of that fire having destroyed records pertaining to phonofilm work? By that I mean the recording of sound.

A. I don't think so; no, in fact.

X Q. 83. And you were intimately connected with Dr. DeForest during this time—1919-1920?

A. Yes, sir; until the Doctor went to Europe.

X Q. 84. That was in July, 1921?

A. Some time in the summer of 1921.

X Q. 85. And you knew that all of these records pertaining to the recording of sound—phonofilm—were kept in this building, 1415 Sedgwick Avenue, which was not burnt?

A. Right. Allow me to qualify just on one point there. The fire at the plant started in the vacuum tube division, where some experiments were being made on the photion tube with high frequency, and that plant was completely destroyed.

X Q. 86. Were the records on the tubes kept in that department or in this No. 1415?

A. The mechanical records of the details of manufacturing, amounts of gas and pressure, etc., may have been kept in that record there. To my knowledge, they were not kept in our own laboratory.

X Q. 87. But the records of the experiments on those tubes and attempts to record sound were kept there?

[fol. 71] A. The results were kept in 1415. The records of the manufacturing and experimenting in the manufacture of those lamps may have been destroyed.

X Q. 88. The records kept of the experiments in the manufacture of the tube may have been destroyed in the fire; but the records kept of the testing of those tubes for recording sound were in the building, 1415, which was not burnt?

A. These results of the tubes were kept in those books (witness points to DeForest Exhibits 1 and 2.)

X Q. 89. About how much money would you estimate Dr. DeForest was spending a year in 1921 in his business of experimenting on phonofilm work?

By Mr. Darby: Objected to as incompetent.

A. Well, I would answer that: Plenty. As to the exact amount, he might have spent $20,000 in that year.

X Q. 90. Would you say he spent at least $10,000.

A. I would say, yes, $10,000.

Cross-examination closed.

Redirect examination.

By Mr. Darby:

R. D. Q. 91. You never saw any notebooks of Dr. DeForest's pertaining to the vacuum tube experiments, as distinguished from recording experiments, in 1415 Sedgwick Avenue, did you?

A. No, none at all.

R. D. Q. 92. You knew that Dr. DeForest was keeping such notebooks, did you not?

A. I wouldn't say I knew positively he was keeping it, [fol. 72] because that work was done by Mr. Coyer—Henry Coyer—in conjunction with Doctor.

R. D. Q. 93. Then, you don't know of your own knowledge whether or not there were any such notebooks?

A. No.

R. D. Q. 94. That was outside your field?

A. Outside my field. I was not concerned with that end of the division. I might state as a matter of record that I was also employed—was in charge of the test division of the radio factory; and my work with Dr. DeForest was incidental to that. I wasn't purely Doctor's assistant in this work.

R. D. Q. 95. What is your recollection as to whether or not the fire at Sedgwick Avenue occurred before Dr. DeForest went to Europe or afterwards?

A. I think it was after Doctor went—after, I would say.

R. D. Q. 96. Is your recollection quite clear on that?

A. No.

R. D. Q. 97. When was the DeForest factory moved from Sedgwick Avenue to New Jersey, to the best of your recollection?

A. I believe it was in 1922.

R. D. Q. 98. And did you move to New Jersey with the DeForest Radio Company?

A. Yes.

R. D. Q. 99. And did Dr. DeForest maintain a laboratory, to your knowledge, in New York for phonofilm work on his return from Germany, apart from the factory in New Jersey?

A. From the time Doctor left the Sedgwick Avenue plant to go to Germany, he never came back and did very much work—in fact, he did no direct phonofilm work—at the radio plant. I believe he opened a studio here in 48th Street.

[fol. 73] R. D. Q. 100. Then, of your own knowledge, you are not familiar with Dr. DeForest's work after that time?

A. From the time he left for Germany I know nothing intimately about his activities.

R. D. Q. 101. You were not intimately familiar with his activities?

A. It was not intimately familiar with his activities.

Redirect examination closed.

Recross-examination.

By Mr. Ward:

R. X Q. 102. Dr. DeForest went to Germany, as I understand it, the last day of July, 1921?

A. About then; in the summer.

R. X Q. 103. And you said the records of the making of tubes were kept in the building that burnt? But as I understand it, all the records and notes of tests and use of tubes for recording sound were in the building that was not burnt?

A. Exactly.

R. X Q. 104. When did Dr. DeForest make his first film sound record of a character which was audible so that you could recognize the voice or the speaking?

A. Well, all of his—I would say 90 per cent. of the records that he made you could recognize a voice, and if you heard it two or three times you could figure out what was being said.

R. X Q. 105. When did he first make a sound film record in which you could recognize that the sound reproduced from the record was the sound intended to be recorded on the film?

A. Very early in 1920.

R. X Q. 106. What date?

[fol. 74] A. I wouldn't give you a date. Say April or May—somewheres along there.

R. X Q. 107. Would it have been earlier than that?

A. It might have been earlier than that, but I didn't hear it.

R. X Q. 108. But you say you were there with him all the time.

A. I was there with him all the time; I went with him in December, 1919.

R. X Q. 109. So if he made one before that date you wouldn't know anything about it?

A. No.

R. X Q. 110. But you were with him as early as January, 1920?

A. Yes. I was not as intimate with his work then as I was a couple of months later, being a new employee.

R. X Q. 111. And the first one you heard of a character you could recognize reproduced sound as that intended to

be recorded was, according to your information, about April or May, 1920?

A. Yes.

Recross-examination closed.

Re-redirect examination.

By Mr. Darby:

R-R. D. Q. 112. Do you recall whether or not Dr. De-Forest was at the factory during the period of the fire?

By Mr. Ward: Objected to as asking for information contrary to the witness' previous answers.

A. I don't recall the Doctor being around. He may have been or may not have been. I am not entirely certain. I don't recall him being there.

[fol. 75] R-R. D. Q. 113. Did you know Mr. Klein at the factory?

A. Dick Klein, yes.

R-R. D. Q. 114. He had a managerial position, did he not?

A. General manager.

R-R. D. Q. 115. And do you recall that after the fire there was some discussion as to whether or not the factory would be rebuilt?

A. Yes.

R-R. D. Q. 116. Do you recall whether or not a rather violent disagreement took place between Mr. Klein and one or more officials of the Company on that occasion?

A. I can't say that I do.

R-R. D. Q. 117. I am endeavoring to refresh your recollection as to the date of the fire. Do you recall a New Year's Eve party that was held at 1415 Sedgwick Avenue?

A. Very, very well.

R-R. D. Q. 118. Was more than one New Year's Eve party held at 1415 Sedgwick Avenue?

A. No.

R-R. D. Q. 119. Was that New Year's Eve party before or after the fire?

A. That was before the fire. The fire occurred about three or four days after. That's right, because inventory was taken during Christmas week, and this party was New

Year's Eve; and the fire occurred, not in the fall, but in January.

R-R. D. Q. 120. Was Dr. DeForest at that party?

A. Very much.

R-R. D. Q. 121. Then, what is your present recollection as to the year in which the fire occurred, having in mind that the evidence in this case is that Dr. DeForest was in [fol. 76] Germany New Year's Eve of 1921-1922?

A. The fire was about the 3rd, 4th, or 5th of January, 1921, because we had just finished taking inventory.

Re-redirect examination closed.

Re-cross-examination.

By Mr. Ward:

R-R. X Q. 122. What was the occasion for this New Year's Eve party?

A. I don't suppose there was any excuse for it, except it was New Year's.

R-R. X Q. 123. Why did you have it on this particular New Year's rather than New Year's of 1920 or 1919?

A. Well, the subsequent results impressed it on my memory very much. The connection is this: I went with Dr. DeForest in December, 1919. In 1919 there was no party—I was only there three or four days. In 1920, no there was no party on New Year's. In 1921 we were preparing—thinking about moving to Jersey City—thinking about moving the plant—and there was only one party were had there at Sedgwick Avenue; so it would have to be at that date.

Re-cross-examination closed.

Deposition closed.

(Signed) William E. Garity.

Suscribed and sworn to before me this 24th day of February, 1928. (Signed) Augusta P. Boos. (Seal.) Notary Public, Queens Co. No. 2011. Certificate filed New York Co. No. 1109. New York County Register's No. —. Commission expires March 30, 1929.

Recess

[fol. 77] DEPOSITION OF ADOLPH G. SENNER

ADOLPH G. SENNER, called as a witness in behalf of the Party DeForest, having been first duly sworn, testifies as follows, in response to questions by Mr. Darby:

Direct examination.

By Mr. Darby:

Q. 1. Please state your full name; age; residence; and occupation.

A. Adolph G. Senner; age, 38; address, 33 Sutton Place, New York City; occupation, motion picture camera man.

Q 2. Are you a member of the Society of Motion Picture Engineers?

A. Yes.

Q. 3. By whom were you employed and in what capacity in 1920 and 1921?

A. Herbert & Huesgen Company, 18 East 42nd Street, as manager of the Motion Picture Department.

Q. 4. You are not employed by Herbert & Huesgen now, are you?

A. No, I left them.

Q. 5. What motion picture camera work was done by Herbert & Huesgen at the time you were in their employ?

A. Well, we supply cameras, projectors, and do developing, printing, making titles.

Q. 6. Sell film?

A. Experiment, and sell film.

Q. 7. During any part of 1920 or 1921 did you come in personal contact with Dr. Lee DeForest?

By Mr. Ward: Objected to as leading.

A. I did.

[fol. 78] Q. 8. In what respect?

A. As a customer.

Q. 9. What did he buy?

A. He purchased a camera—motion picture camera.

Q. 10. Did he purchase anything else?

A. He purchased films; he purchased developers.

Q. 11. Did he have any developing work done?

A. He did quite frequently.

Q. 12. Did you personally have charge of the dealings with Dr. DeForest for Herbert & Huesgen Company?

A. Yes.

Q. 13. It has been testified in this case that Dr. DeForest bought an Ernemann motion picture camera for $330. Did you sell that camera to Dr. DeForest?

By Mr. Ward: Objected to as leading.

A. I did.

Q. 14. It has also been testified that this camera was sold to Dr. DeForest on February 18, 1921, according to the records of Herbert & Huesgen. Did you have anything to do with securing the date of that sale from Herbert & Huesgen?

By Mr. Ward: Objected to as leading.

A. I did.

Q. 15. Did you do any developing work for Dr. DeForest before the camera was purchased?

By Mr. Ward: Same objection.

A. Frequently.

Q. 16. What was the nature of the work?

[fol. 79] A. The nature was standard motion picture film in short lengths, containing voice record—sound record—as far as I could tell at the time.

Q. 17. Did they, prior to the purchase of the camera, contain any pictures?

A. Not to my recollection.

Q. 18. And after the purchase of the camera, did Herbert & Huesgen still continue to do developing work?

A. At intervals.

Q. 19. Did that work include the sound records?

A. Yes, pictures and sound records on the one film.

Q. 20. On the one film?

A. On the one film.

Q. 21. How soon after the purchase of the camera did you do developing work where the picture and sound were on the same film?

A. Within a few days.

Q. 22. Did you examine the film after it was developed?

A. No, but I called Dr. DeForest's attention to the fact that the pictures were very much under-exposed.

Q. 23. Well, just describe in non-motion-picture language how the films looked.

A. Dr. DeForest, as far as I could gather at the time—he never told me exactly how his method worked—but he tried to get a film record showing the picture and the sound record; and when he brought in this film, I pointed out to him, and he himself realized, that the picture was very much under-exposed; in other words, had not sufficient light to record properly on the film.

Q. 24. But how was the sound record?

[fol. 80] A. The sound record was rather dense. In other words, the two were very much in contrast,—one was over-exposed, and the other was under-exposed,—which meant one had too much light and one had too little light.

Q. 25. And I understand that you called Dr. DeForest's attention to that fact.

A. Yes.

Q. 26. Did Dr. DeForest describe to you any way that he had in his mind to overcome that difficulty?

A. Well, he had many ideas, and amongst others he had the idea of using a separate film for the picture and for the sound.

Q. 27. That is, one film for the picture and one film for the sound?

A. Yes; which I immediately discouraged on account of the impracticability to my mind; and I recommended the use of more powerful lights for his subject, in order to equalize the exposure—bring them up to the strength of the sound recording exposure.

Q. 28. Did Dr. DeForest say anything to you as to whether he was discouraged in his idea or was more in favor of yours?

By Mr. Ward: Objected to as calling for hearsay.

A. I don't think we discussed it very much, as far as I remember. He had his own mind about the subject, and I had my own opinion.

Q. 29. How soon after the purchase of this camera did this occurrence take place,—your calling his attention to the film?

A. As far as I remember—he was very anxious to see [fol. 81] first results naturally—this question came up and my recommendation was made at perhaps the first or sec-

ond attempt; it must have been within a week or ten days of the purchase of the camera.

Q. 30. Did Herbert & Huesgen continue to sell Dr. DeForest supplies and develop film subsequent to that time?

A. Yes.

Q. 31. How frequently? That is, once a week, or what?

A. We continued to sell him supplies, but I think the developing work was less frequent. It is my recollection he purchased some developing outfit of his own—special apparatus to do it in longer lengths than what he had been before.

Q. 32. And about how frequently was he purchasing supplies from you subsequently to his purchase of the camera?

By Mr. Ward: Objected to as irrelevant and immaterial.

A. Well, I should say I saw him perhaps three times a week, either on matters of calling for finished work or purchasing new material.

Q. 33. That lasted for how long?

A. After the purchase of the camera?

Q. 34. Yes.

A. I should say several months, becoming less frequent as time went on.

Q. 35. You are not connected with the DeForest Phonofilm, are you?

A. Never have been, and am not connected now in any way.

Q. 36. And you are not interested in this controversy one way or the other?

[fol. 82] A. Don't even know what it's about.

By Mr. Ward: All of which shows the irrelevancy of the testimony of the witness.

Direct examination closed.

Cross-examination.

By Mr. Ward:

X Q. 37. As I understand your testimony, prior to the date of the purchase of the camera from your concern by Dr. DeForest, which was in February, 1921, he had brought to your concern or sent to your concern motion picture film having sound records printed thereon?

A. Not printed thereon, but we developed it. He brought undeveloped film. We found sound records after development.

X Q. 38. How did you know they were sound records?

A. Dr. DeForest told me so.

By Mr. Ward: The testimony of this witness on this point is, therefore, objected to as hearsay.

X Q. 39. Now, as I understand it, up to the time that the camera was purchased none of these picture films that you developed contained pictures?

A. No.

X Q. 40. And as I understand you, shortly after the purchase of this motion picture camera from your concern by Dr. DeForest, he brought in motion picture film, upon which, after you developed it, you found picture records and sound records?

A. Yes.

X Q. 41. Are you certain of that?

A. Absolutely.

X Q. 42. Your assistant, Mr. Torma, has just testified in [fol. 83] this case that the motion picture film never had picture records thereon. What have you got to say to that?

By Mr. Darby: I think opposing counsel has unintentionally misstated the testimony of Mr. Torma. The testimony of Mr. Torma, as I recall it, was that he stated that none of the films that he had seen had any pictures on the sound records.

By Mr. Ward: I will accept the amendment to my question if the record shows that.

X Q. 43. Do you still maintain that the motion picture film that you developed for Dr. DeForest after the purchase of the camera had pictures on it?

A. I maintain that. But I want to qualify this by saying that there might have been times that Dr. DeForest, during intervals of time, had tested out his camera without the taking of actual pictures, just recording the sound waves.

X Q. 44. What records, if any, have you got to show that Dr. DeForest sent to you any film with pictures and sound records taken thereon prior to April or May, 1921?

A. Nothing but my memory. A record of that kind never could be used, because no records are kept of what the film contains in the way of picture or sound waves.

X Q. 45. And you are testifying entirely from memory now over a period of about seven years, are you not?

A. I am testifying from memory that the film contained pictures and sound waves; and the record of the camera purchase is an established fact.

[fol. 84] X Q. 46. And I say, testifying entirely from memory after a lapse of seven years, are you prepared to swear that as early as May 1st, 1921, Dr. DeForest brought you picture film having picture records and sound records thereon?

A. I do not testify to any dates, except the fact that the camera purchase is an established date and that right thereafter these records have been brought to me and have been developed.

X Q. 47. Well, if you testify that they were brought to you and developed right thereafter, you are testifying positively that the films were brought to you containing pictures and sound records prior to May 1st, 1921, are you not?

A. It would appear so.

X Q. 48. Well, are you so testifying or not?

A. I am not testifying as to the exact date that this happened. I am relying on the fact, which has been established, that the camera was purchased on a certain date, and that right thereafter this development took place.

X Q. 49. Well, I want you to testify "yes" or "no" to the following question: Did Dr. DeForest bring to you film having picture records and sound records thereon prior to May 1st, 1921?

A. Based on the fact that the camera was purchased prior to the date, I do.

By Mr. Ward: I object to the answer, and ask for a "yes" or "no" answer to my question.

X Q. 50. (X Q. 49 repeated.)

A. I do not wish to take the responsibility of the date of the purchase of the camera, because I have no records in my possession; but if the record can be proven correct, [fol. 85] I certainly do testify to that date.

X Q. 51. I repeat the former question, and ask you to

testify "yes" or "no" as to whether films were brought to you by Dr. DeForest having pictures and sound records thereon prior to May, 1921.

By Mr. Darby: In the effort to meet opposing counsel's insistence on a categorical answer, in view of the witness' last answer, I advise the witness that, for the purpose of answering "yes" or "no" to this question, he can accept the date of acquisition of the camera by Dr. DeForest as of February 18, 1921.

By Mr. Ward: I object to the remarks of counsel, and call the Examiner's attention to the fact that this witness' testimony is worthless to establish the fact interrogated about unless he can testify that the film with the picture and sound records thereon were shown to him prior to May 1st, 1921.

By Mr. Darby: I think we will leave to the proper tribunal the question of the value of this witness' testimony. The witness has made it perfectly apparent from his previous testimony that the film with picture and sound records thereon were developed within a week or ten days after Dr. DeForest acquired the camera. The witness, in his previous answers has repeated the fact that his testimony as to date is based on the date of acquisition of the camera. I, therefore, advise the witness that he is not compelled to answer the question "yes" or "no" without the quali- [fol. 86] fication which he has already stated, namely, that if that was the date that Dr. DeForest acquired the camera, then his answer can follow.

X Q. 52. Do you refuse to answer the question as propounded to you by me?

A. With the qualification of Mr. Darby's explanation as to the date of the purchase of the camera, I answer, yes.

X Q. 53. Then you base the time of this disclosure to you entirely on the fixing of the date of the purchase of the camera; is that correct?

A. Exactly.

X Q. 54. And according to your testimony, when you received this film from Dr. DeForest having the picture records and sound records taken thereon and developed the same, you found that the pictures were very much underexposed and the sound records over-exposed, and you called Dr. DeForest's attention to that fact?

A. He called my attention to the fact; and I verified it.

X Q. 55. You testified on direct examination, if I am not mistaken, that you called it to his attention.

A. We both discussed the matter. It was his film and his work, and therefore he showed me when it was developed and pointed out the deficiency, and I concurred with him in his opinion.

X Q. 56. That was about when?

A. Within a few days of the purchase of the camera.

X Q. 57. And you rely upon the date of purchase of the camera to establish this date?

A. Positively.

X Q. 58. And you say that Dr. DeForest told you that [fol. 87] he intended to overcome this trouble by taking the sound record and picture record on two different films?

A. He told me the best in his opinion would be to have pictures taken on a film and sound records taken on a film and have them printed on a third film, so the sound record would come out in the same density as the picture.

X Q. 59. And you had some other scheme you thought was better?

A. To me at that time it looked going around in a difficult way, and I suggested to him that he could overcome this under-exposure of the picture by using more light.

X Q. 60. And did he try out your scheme?

A. That I couldn't say.

X Q. 61. How did he overcome this difficulty that you found him faced with?

A. That I couldn't say, because he did his own work in his own laboratory until he perfected this phonofilm.

X Q. 62. Well, you have testified you continued to develop film for him some time after the purchase of this camera?

A. But we never carried it far enough to see the perfected film.

X Q. 63. Did the films continue to have this defect as long as you developed them for him?

A. At times it was the reverse.

X Q. 64. And the defect of over-exposure of one and under-exposure of the other continued throughout the time you developed film for him?

A. Yes; correct.

X Q. 65. You have testified that you developed film of this character for him up to what time?

[fol. 88] A. I should say for several months after the purchase of the camera.

X Q. 66. Up to what time? What month would you call "several months"?

A. Two or three months.

X Q. 67. That is, up to April or May?

A. I couldn't say.

X Q. 68. Well, what is your best opinion as to the time when you stopped doing this work for him?

A. Two to three months is the best of my recollection.

X Q. 69. Two months would bring you up to April 18th, and three months would bring you up to May 18th, would it not?

A. I don't want to go on record as definitely establishing the length of that period; it might be as much as six months.

X Q. 70. And it is your testimony that you had less of this work for Dr. DeForest after the purchase of the camera than before?

A. After a period of several months, yes, the amount of work declined.

Cross-examination closed.

Redirect examination.

By Mr. Darby:

R. D. Q. 71. How long have you been in the motion picture business?

A. Twelve years.

Redirect examination closed.
No recross-examination.
Deposition closed.

Signature of the witness waived by consent of counsel.

[fol. 89]

Stipulation

It is hereby stipulated by and between counsel for the respective parties that exhibits offered in evidence by either party may be retained in the custody of offering counsel until the hearing, subject to inspection by opposing counsel upon reasonable notice.

Stipulation

It is stipulated and agreed that if Samuel E. Darby, Jr., were called as a witness in this case, he would testify that he received the data on which the application of DeForest involved in this interference was based at least as early as June 30, 1921, as shown in the papers which are here offered in evidence on behalf of DeForest as "DeForest Exhibit No. 4."

(Papers referred to are marked in evidence as "DeForest Exhibit No. 4.")

It is further stipulated and agreed that, inasmuch as DeForest's testimony was taken subsequent to the time allowed for DeForest to complete his testimony to meet mutual convenience of counsel the testimony-in-chief of DeForest, which is now closed, with the consent of the Honorable —— ——, Commissioner of Patents, is accepted nunc pro tunc.

Testimony-in-chief of DeForest closed.

Notarial certificate waived by consent of counsel.
Feb. 24, 1928.

(Signed) Augusta P. Boos. (Seal.) Notary Public, Queens Co. No. 2011. Certificate filed New York Co. No. 1109. New York County Register's No. —. Commission expires March 30, 1929.

E. L. GREENSFELDER.

METHOD AND APPARATUS FOR SYNCHRONOUSLY PRODUCING SOUNDS TO ACCOMPANY MOTION PICTURES.

APPLICATION FILED MAR. 30, 1916.

1,254,684.

Patented Jan. 29, 1918.

4 SHEETS—SHEET 1.

Fig. 1.

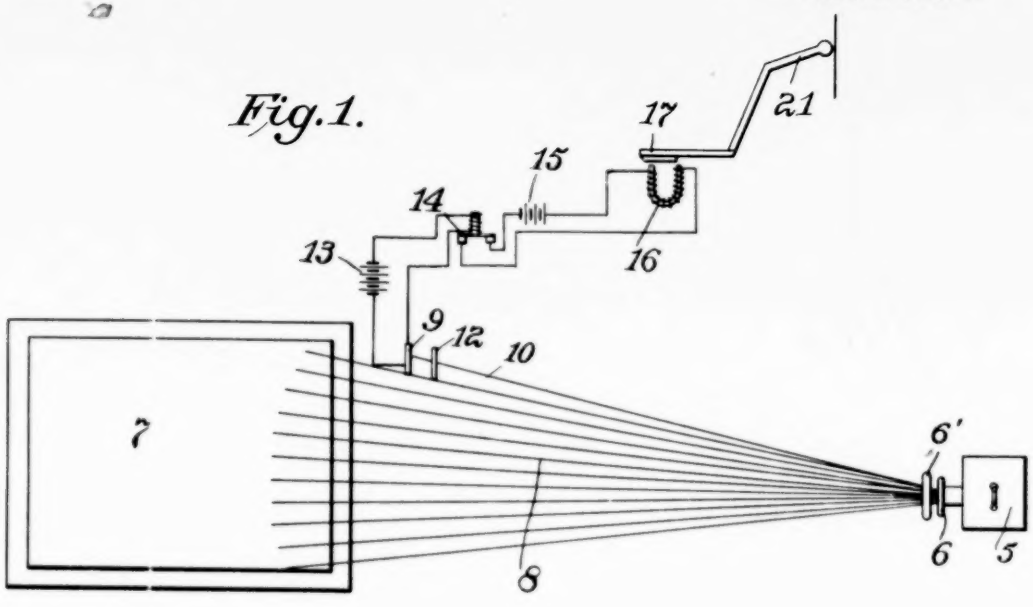


Fig. 2.

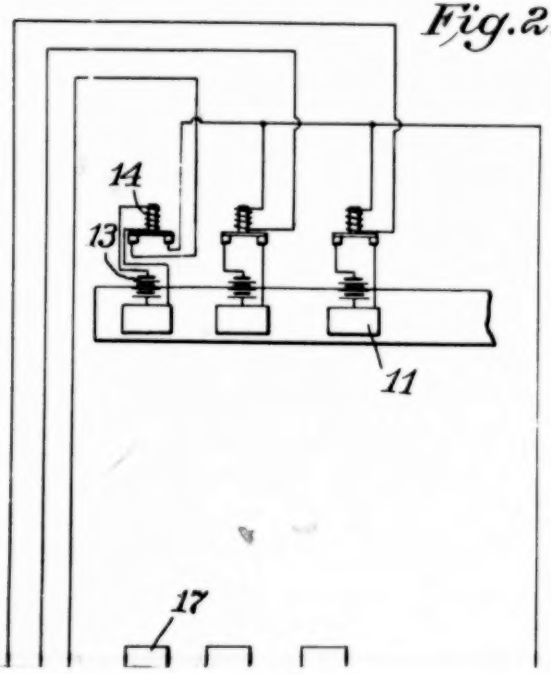
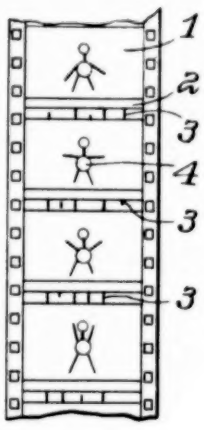


Fig. 3.



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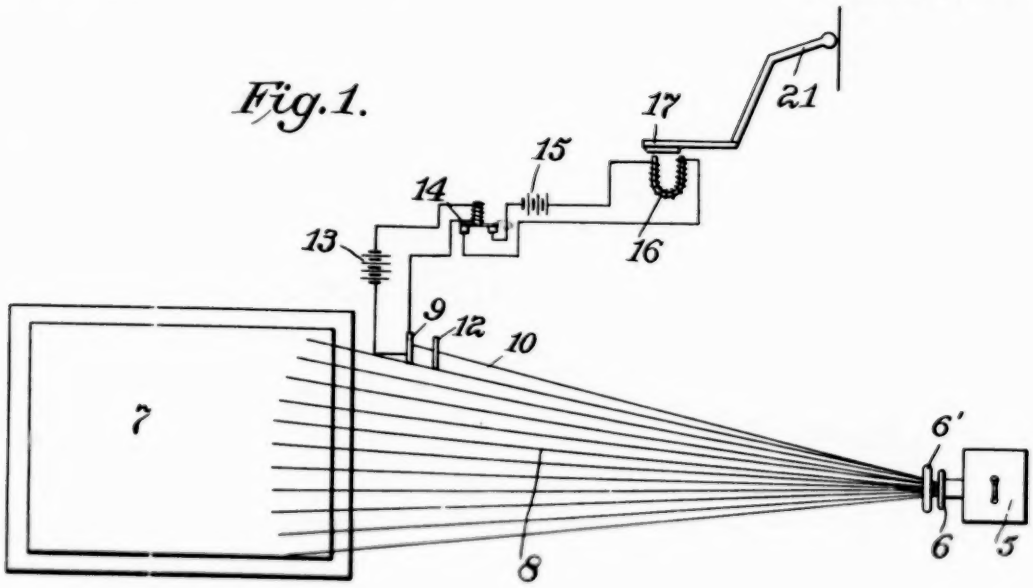


Fig.2.

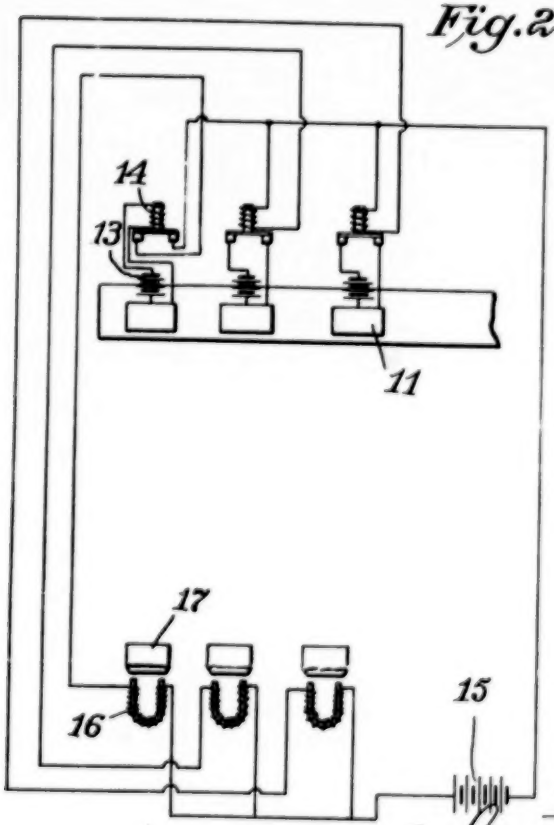
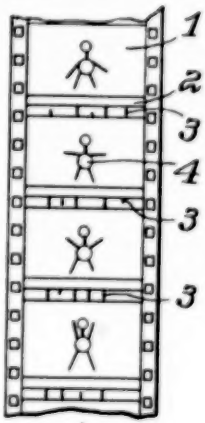


Fig.3.



Inventor:
Elmer L. Greensfelder,
by Spear, Middleton, Donaldson & Spear
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E. L. GREENSFELDER.

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4 SHEETS—SHEET 2.

Fig. 4.

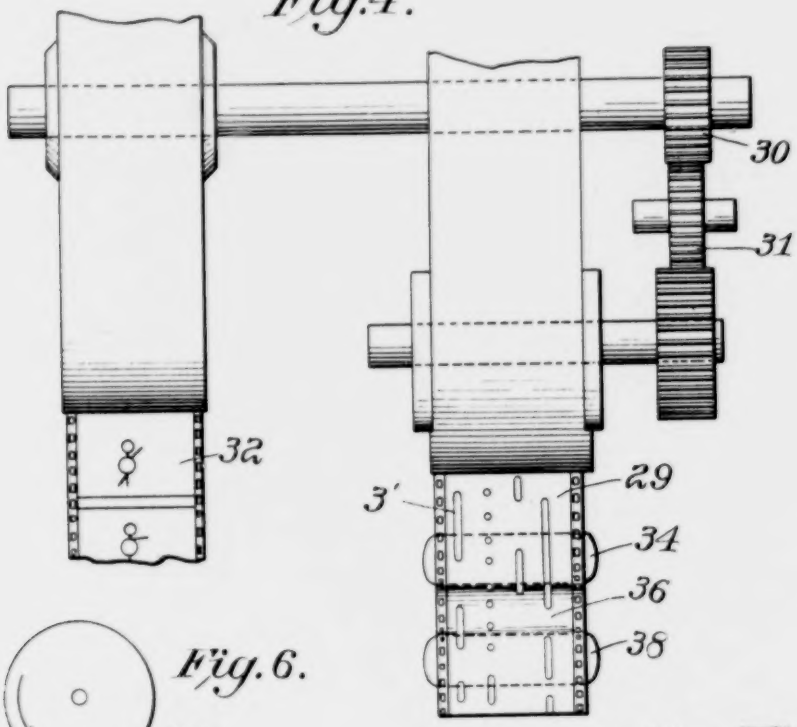


Fig. 6.

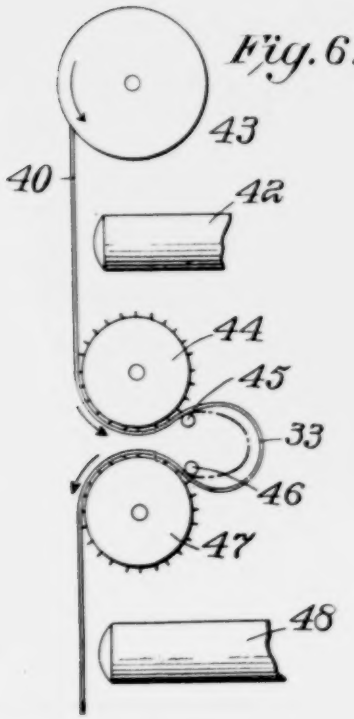
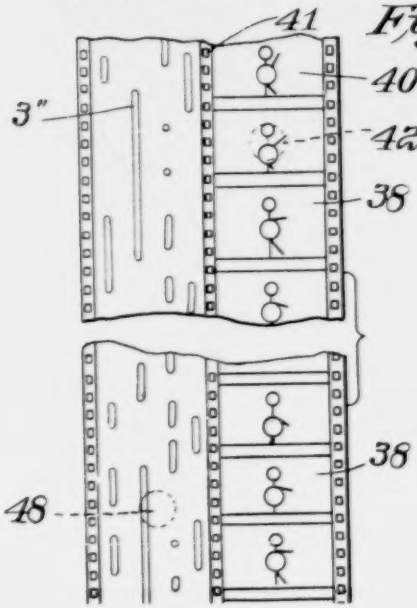


Fig. 5.



1,254,684. APPLICATION FILED MAR. 30, 1916. Patented Jan. 29, 1918.

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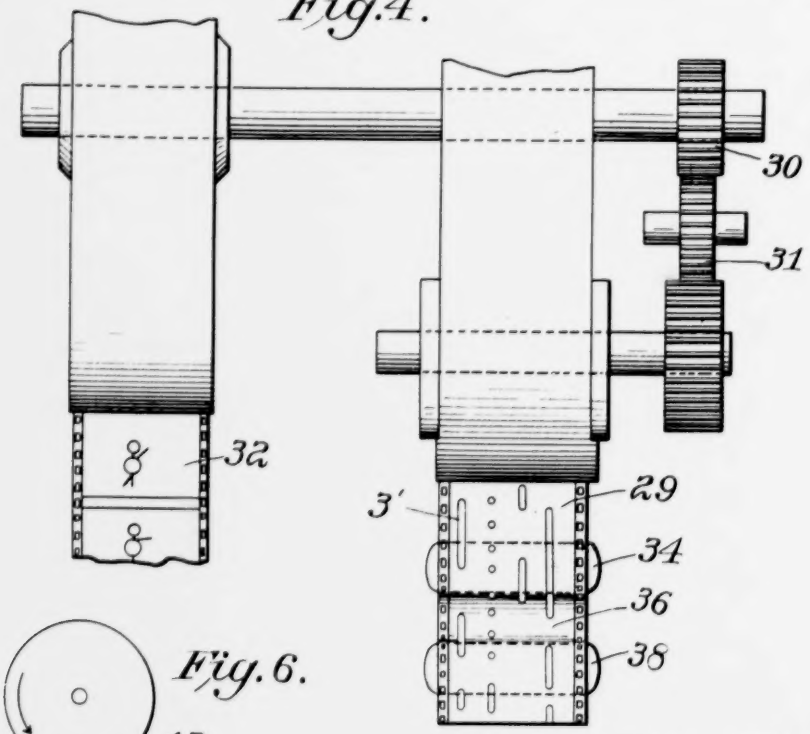

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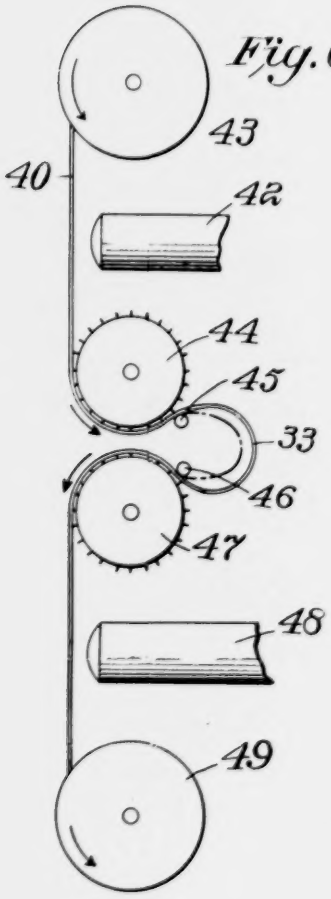
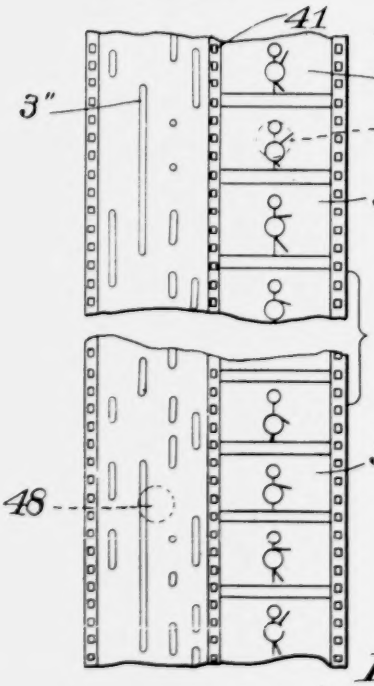


Fig. 5.



Inventor:

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4 SHEETS—SHEET 3.

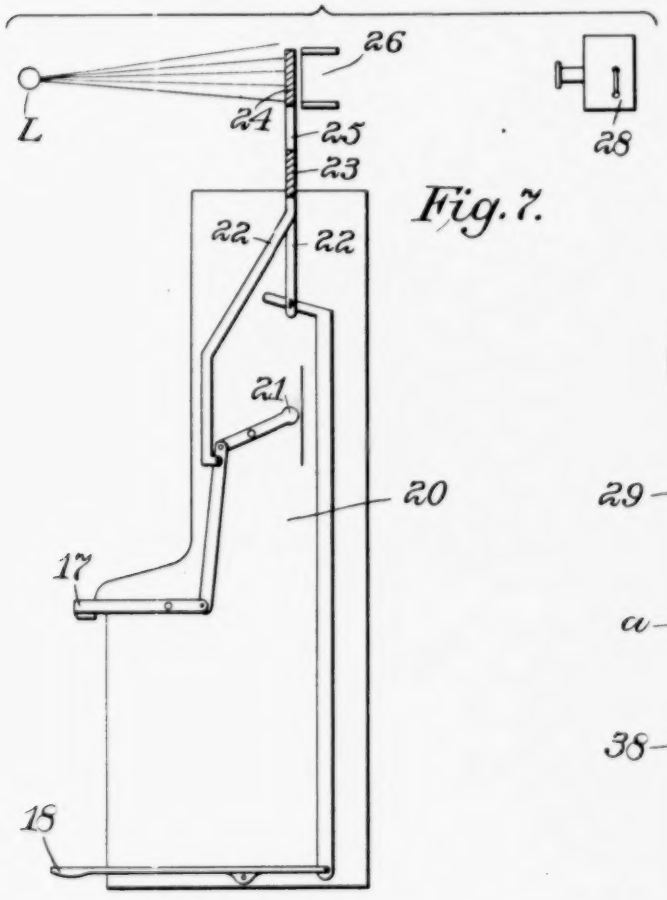


Fig. 7.

Fig. 9.

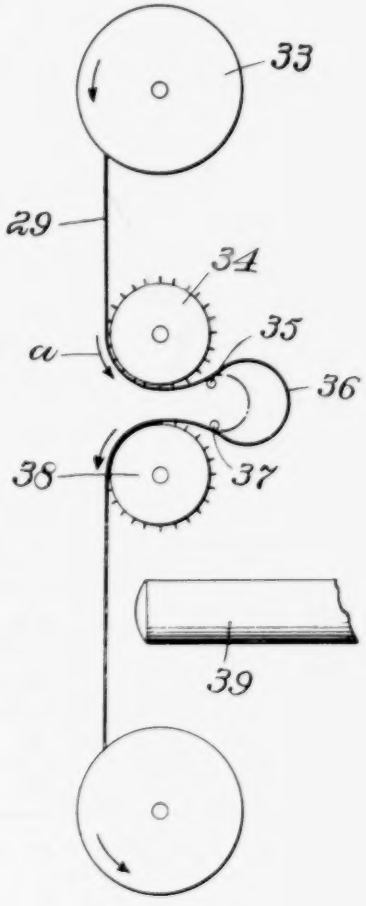
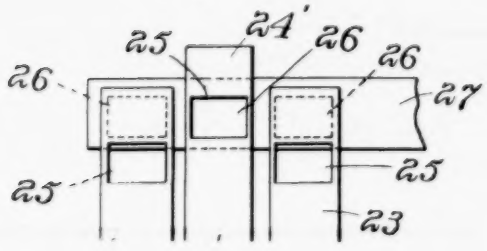
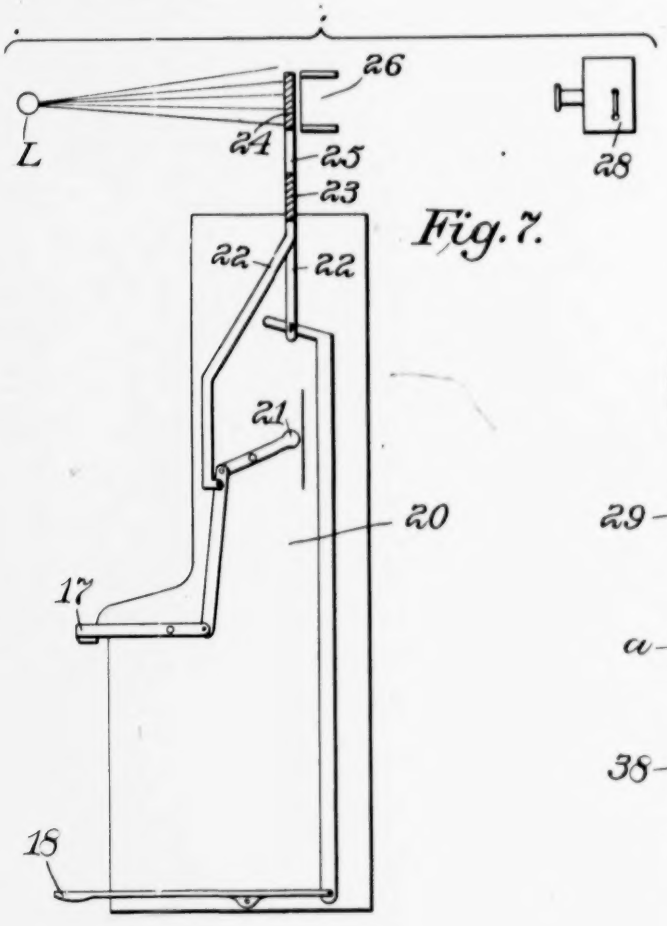


Fig. 8.





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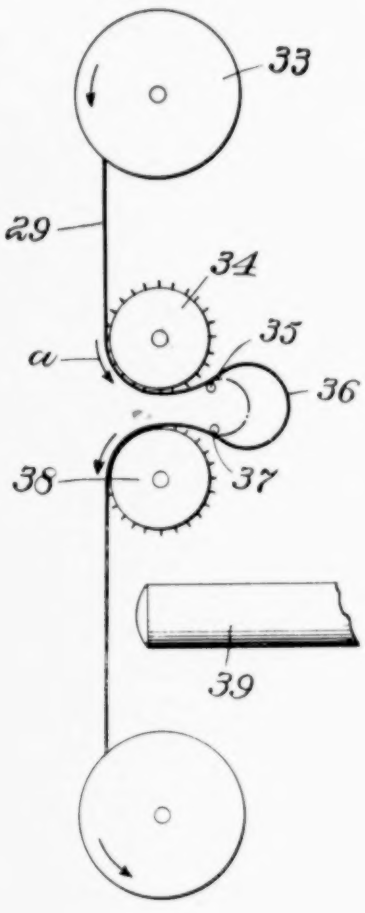
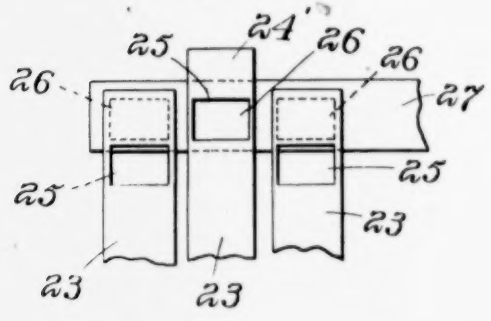


Fig. 8.



Inventor:
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APPLICATION FILED MAR. 30, 1916.

1,254,684.

Patented Jan. 29, 1918.

4 SHEETS—SHEET 4.

Fig. 10.

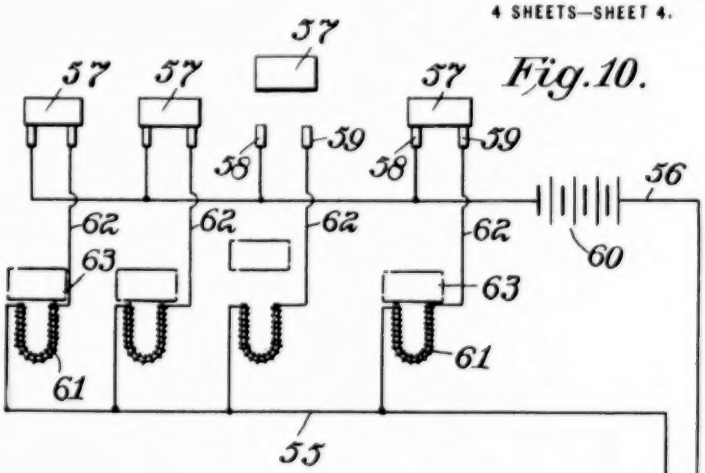
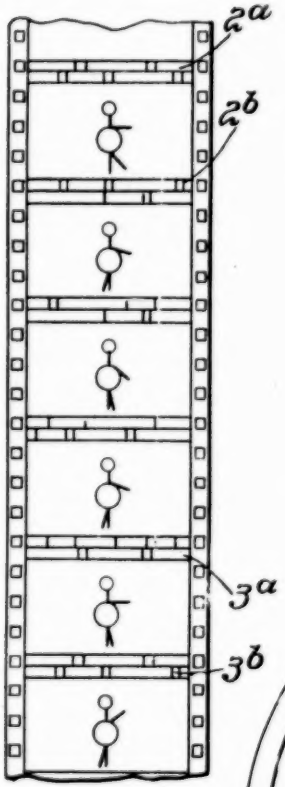


Fig. 11.



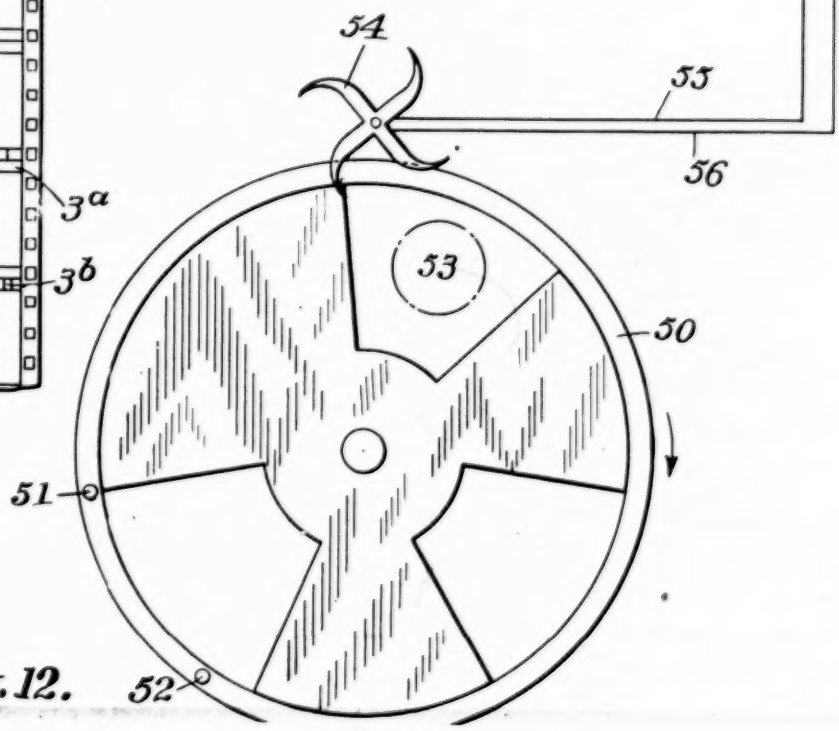


Fig. 12.

UNITED STAT

ELMER LEWIS GREENS

METHOD AND APPARATUS FOR SYN
M

1,254,684. Specifi

Application filed

To all whom it may concern:

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IDS TO ACCOMPANY MOTION PICTURES.

Patented Jan. 29, 1918.

4 SHEETS—SHEET 4.

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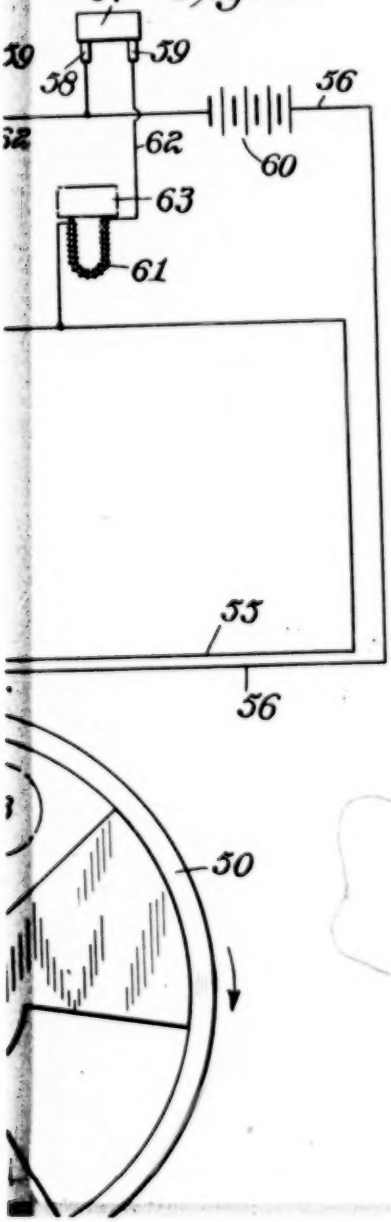


UNITED STATES PATENT OFFICE.

ELMER LEWIS GREENSFELDER, OF BALTIMORE, MARYLAND.

METHOD AND APPARATUS FOR SYNCHRONOUSLY PRODUCING SOUNDS TO ACCOMPANY MOTION-PICTURES.

1,254,684. Specification of Letters Patent. Patented Jan. 29, 1918.

Application filed March 30, 1916. Serial No. 87,788.

To all whom it may concern:

Be it known that I, ELMER L. GREENSFELDER, a citizen of the United States, and residing at Baltimore, Maryland, have invented certain new and useful Improvements in Methods and Apparatus for Synchronously Producing Sounds to Accompany Motion-Pictures, of which the following is a specification.

The present invention relates to an improved method of producing different sounds during the projection of motion pictures upon the object screen. As is customary at present, while the pictures are being shown upon the screen, the orchestra plays appropriate musical selections. In order to produce a more realistic effect the music is generally chosen and conducted so as to give added expression to the actions and descriptive scenes being reproduced in pantomime on the screen. Unusual sounds, such as the report of a gun, the shriek of a whistle, the clatter of horses' feet, the cry of a child, the ringing of a bell, etc., all of which add greatly to the vividness of the scene, are generally assigned to one of the men in the orchestra to be reproduced as nearly in synchronism with the corresponding action in the picture as possible.

The object of the present invention is to provide an improved method whereby these various supplemental sounds, or even the piano accompaniment will be produced by the various instruments in exact synchronism with the reproduction on the picture screen of the scene of which they are illustrative.

The invention consists in providing a system of control for these several instruments which will be automatically operated by the picture film itself. It consists, more specifically, in photographing on the film a series of lines, or marks, disposed parallel to the length of the film and suitably positioned ing a whistle, or producing like noises. The light from the motion picture machine passes through these transparent "sound marks" as the film is being shown on the screen. These light rays are intercepted between the lens of the machine and the screen, or at the screen, and caused to fall upon a series of exposed, separate, selenium cells. An individual selenium cell is provided for each "sound mark" of the film and each ray of light is directed by a system of slots and guides to exactly register with its corresponding cell. These cells are in turn each connected with a separate relay, electric battery and electro-magnet, the latter being so placed as to mechanically operate the sound instrumentality upon its becoming energized.

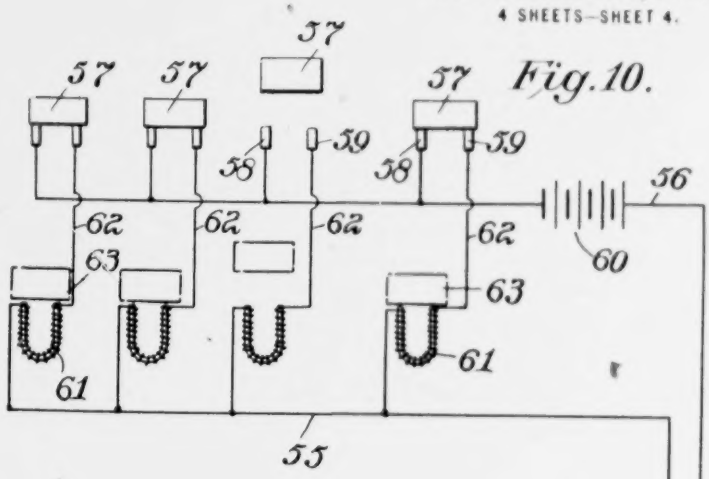
The invention further contemplates the provision of a method by which the musical instruments may be controlled and instrumental selections rendered separately and independently of the pictures, as for example, during the intermission of performances, or at any desired time or place.

The invention includes among other objects suitable arrangements and connections, whereby the sound producing instruments may be located near the screen or at a point sufficiently remote from the motion picture machine to produce the desired effects upon the audience.

The invention, while embodying in all of its forms the main principles of operation above set forth, may be varied somewhat to adapt itself to different kinds of machines. For example as previously pointed out, the "sound marks" may be placed on the picture film and be operated by the intermittent feed of the machine. Besides this method the "sound marks" might be formed on a separate reel of film adapted to have a continuous motion and geared to the sprocket turn-

1,254,684. APPLICATION FILED MAR. 30, 1916. Patented Jan. 29, 1918.
4 SHEETS—SHEET 4.

Fig. 10.



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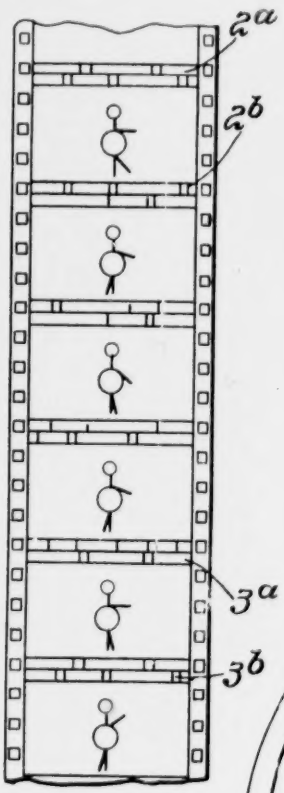


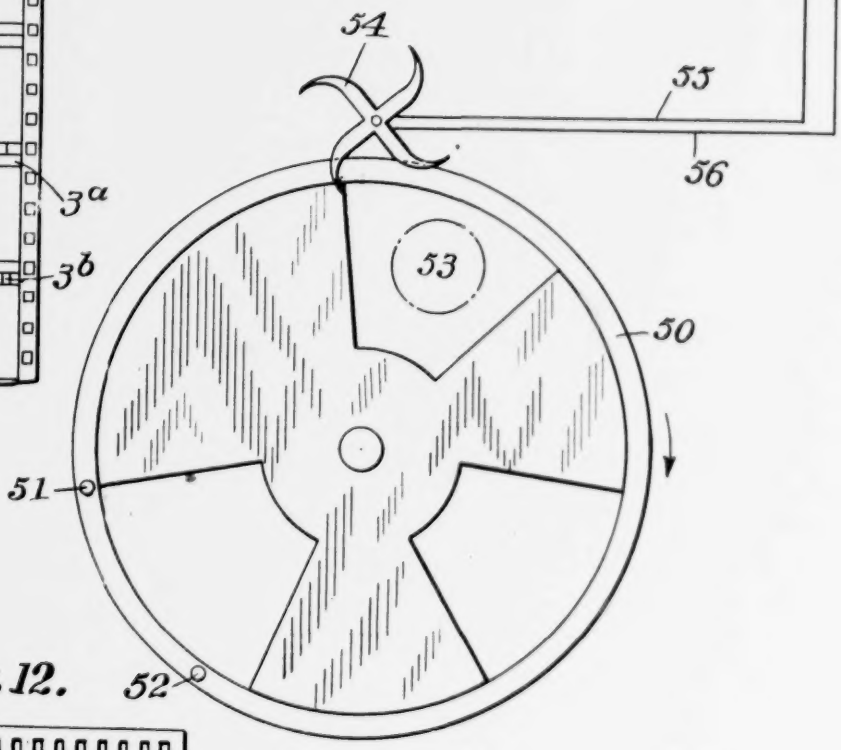
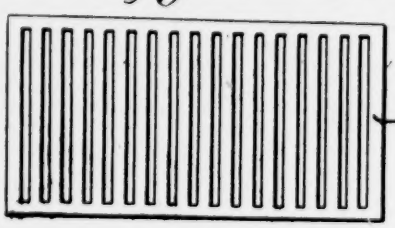


Fig. 12.



Inventor:
Elmer L. Greensfelder,
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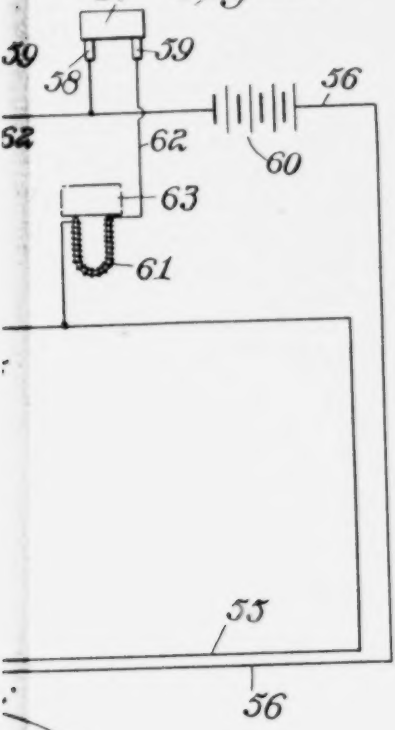
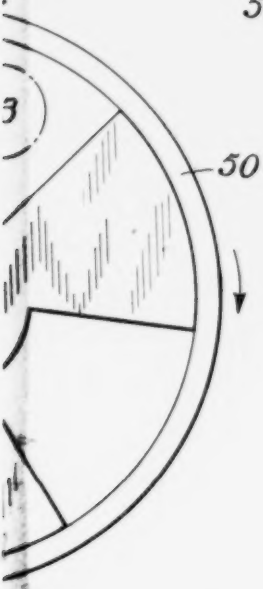
The invention consists in providing tem of control for these several instru which will be automatically operated b picture film itself. It consists, more cally, in photographing on the film a of lines, or marks, disposed parallel length of the film, and suitably posi in relation to the individual pi of the scene being reproduced, company the action or description wi is desired to have emphasized by the sponding sound. These lines or mar made transparent, white, or translucen darkened background. The lines may represent one note of a piano (in the a piano record), while others may re an expression lever, a sustaining pe the operating mechanisms, or instrume ties for beating a drum, ringing a bell

Fig. 10.





Inventor:

mer L. Greensfelder,

Reynolds & Spear

Atty's

Application filed March 30, 1916. Serial No. 87,788.

To all whom it may concern:

Be it known that I, ELMER L. GREENSFELDER, a citizen of the United States, and residing at Baltimore, Maryland, have invented certain new and useful Improvements in Methods and Apparatus for Synchronously Producing Sounds to Accompany Motion-Pictures, of which the following is a specification.

The present invention relates to an improved method of producing different sounds during the projection of motion pictures upon the object screen. As is customary at present, while the pictures are being shown upon the screen, the orchestra plays appropriate musical selections. In order to produce a more realistic effect the music is generally chosen and conducted so as to give added expression to the actions and descriptive scenes being reproduced in pantomime on the screen. Unusual sounds, such as the report of a gun, the shriek of a whistle, the clatter of horses' feet, the cry of a child, the ringing of a bell, etc., all of which add greatly to the vividness of the scene, are generally assigned to one of the men in the orchestra to be reproduced as nearly in synchronism with the corresponding action in the picture as possible.

The object of the present invention is to provide an improved method whereby these various supplemental sounds, or even the piano accompaniment will be produced by the various instruments in exact synchronism with the reproduction on the picture screen of the scene of which they are illustrative.

The invention consists in providing a system of control for these several instruments which will be automatically operated by the picture film itself. It consists, more specifically, in photographing on the film a series of lines, or marks, disposed parallel to the length of the film, and suitably positioned in relation to the individual pictures of the scene being reproduced, to accompany the action or description which it is desired to have emphasized by the corresponding sound. These lines or marks are made transparent, white, or translucent on a darkened background. The lines may each represent one note of a piano (in the case of a piano record), while others may represent an expression lever, a sustaining pedal, or the operating mechanisms, or instrumentalities for beating a drum, ringing a bell, blowing a whistle, or producing like noises. The light from the motion picture machine passes through these transparent "sound marks" as the film is being shown on the screen. These light rays are intercepted between the lens of the machine and the screen, or at the screen, and caused to fall upon a series of exposed, separate, selenium cells. An individual selenium cell is provided for each "sound mark" of the film and each ray of light is directed by a system of slots and guides to exactly register with its corresponding cell. These cells are in turn each connected with a separate relay, electric battery and electro-magnet, the latter being so placed as to mechanically operate the sound instrumentality upon its becoming energized.

The invention further contemplates the provision of a method by which the musical instruments may be controlled and instrumental selections rendered separately and independently of the pictures, as for example, during the intermission of performances, or at any desired time or place.

The invention includes among other objects suitable arrangements and connections, whereby the sound producing instruments may be located near the screen or at a point sufficiently remote from the motion picture machine to produce the desired effects upon the audience.

The invention, while embodying in all of its forms the main principles of operation above set forth, may be varied somewhat to adapt itself to different kinds of machines. For example as previously pointed out, the "sound marks" may be placed on the picture film and be operated by the intermittent feed of the machine. Besides this method the "sound marks" might be formed on a separate reel of film adapted to have a continuous motion and geared to the sprocket turning the picture reel. Again a continuous method of projecting the "sound marks" may be employed in which a widened reel is used, on one side of which are the "sound marks", while the pictures occupy the remaining space.

With these and other objects in view the invention consists in the combination and arrangement of parts more fully described in the following specification, illustrated in the accompanying drawings and pointed out in the appended claims.

In the drawings the various methods by which the invention may be put into practice are illustrated diagrammatically by a series of views suggesting the arrangement and use of the several forms of apparatus employed.

In the drawings:—

Figure 1 is a diagrammatic view illustrating one embodiment of the present invention.

Fig. 2 is a diagram showing the electrical connections for the same more in detail.

Fig. 3 is a portion of a film of usual type having one arrangement of "sound marks" photographed thereon.

Fig. 4 illustrates diagrammatically a modified arrangement involving the use of two separate films driven synchronously.

Fig. 5 is a diagrammatic plan view illustrating a further modified arrangement involving the use of a double width film.

Fig. 6 illustrates the arrangement of Fig. 5, shown in side elevation.

Figs. 7 and 8 illustrate diagrammatically in side and front elevational views respectively the apparatus used in recording the "sound marks" on a film.

Fig. 9 illustrates diagrammatically take-up mechanism used to move the film at a constant speed before the projecting apparatus.

Fig. 10 illustrates diagrammatically an arrangement for sustaining the connecting of the electric circuits until the next consecutive row of "sound marks" is before the projecting lens.

Fig. 11 is a modified form of film.

Fig. 12 illustrates the screen 12.

The invention will first be described in connection with the method illustrated by the diagrammatic views, Figs. 1, 2 and 3, in which a series of "sound marks" are recorded on a small section of the ordinary picture film. Fig. 3 shows a fragmental strip 1 of an ordinary motion picture film, having the usual transverse sections 2 on which there is no photograph or marking. In addition this view shows horizontal rows of "sound marks" 3, located immediately above the picture 4 and below the section or blank strip 2. It is obvious that the "sound marks" 3 could be located equally well below the picture rather than above. These "sound marks" consist of a series of transthis specification. Fig. 1 illustrates diagrammatically the relative position and arrangement of all the instrumentalities employed in the use of an ordinary film carrying the "sound marks" 3 thereon at intervals between the pictures. The projecting motion picture machine 5, with its lens 6 and shutter 6′ is suitably located so as to project the pictures on the object screen 7, 8 representing the cone of light rays passing from the lens to the screen. A shelf 9 is placed at a suitable point between the lens 6 and screen 7, or at the screen 7, so as to intercept the rays of light 10 coming from the film through the "sound marks" 3. The shelf 9 contains a plurality of selenium cells or plates 11 arranged in a horizontal row corresponding in number and arrangement to the "sound marks" 3 on the film. A slotted screen or grating 12 may be properly positioned in front of the shelf 9 for the purpose of reducing the magnified light rays coming from the "sound marks" and preventing overlapping of the rays on the selenium surfaces. Each particular "sound mark" 3 on the film has a corresponding selenium cell 11 on the shelf 9, upon which it is adapted to impinge a ray of light as it passes between the light source and the lens of the projecting machine. When, for example, it is desired to apply the invention for the purpose of operating a player piano, eighty-eight "sound marks" 3 are provided, one for each note of the piano and additional "sound marks" for expression levers. The number and arrangement of these "sound marks" can be varied at will according to the number and variety of sound instruments it is desired to operate.

As previously pointed out, the rays of light 10 being dispersed and directed through the "sound marks" 3 and then reduced by the slits of the grating 12, are directed upon the corresponding selenium cells 11. These latter are each connected with a battery 13 in series with a corresponding relay 14, which in turn are connected through a second battery 15, each to a corresponding electro-magnet 16 adapted to operate a control lever 17 of a piano key, expression pedal, drum stick or other sound producing instrument. It is well known that selenium, when exposed to a concentrated ray of light, changes its conductivity with

batteries, one for each relay. Again either battery 15 or batteries 13 could be replaced by a source of current, such as the house current, connected through a transformer.

The position of the shelf 9, containing the selenium cells 11, can be placed at any arbitrary point in the path of the light rays coming through the "sound marks" 3, either at or near the screen 7, or at a point about midway between the screen and the lens (as shown in Fig. 1), or near the operator's room. In order to effect the different locations of the shelf 9, a mirror may be placed in the path of the projected light rays so as to reflect them at any desired angle. A special lens may be placed near the projecting camera, through which the light rays are passed and dispersed so as to allow the shelf 9 to be placed within a comparatively short distance of the projecting lens of the motion picture machine.

Instead of using a separate selenium cell for each "sound mark" as proposed, a single structure may be used with an exposed selenium surface which is divided lengthwise electrically into as many sections as there are sounds and expressions to be operated by tapping off at regular intervals and connecting separately with the sources of current, relays, electro-magnets and corresponding sound instruments and expression levers to be operated. A shelf of thin partitions placed before the subdivided selenium surface would prevent the interference of the light ray coming from a "sound mark" with any selenium surface subdivision except its corresponding one.

The method of photographing the "sound marks" 3, as used in the method illustrated in Figs. 1 to 3, will next be described in detail and reference is made to Figs. 7 and 8 of the drawing. The rows of "sound marks" are photographed onto the picture film by a motion picture camera, the film of which is moved intermittently as is done in photographing an ordinary motion picture scene. It is absolutely necessary that the film be moved, while the "sound marks" are being photographed, at exactly the same speed at which the picture film, of which they are to control the accompanying sounds and music, is moved. By way of illustration, Figs. 7 and 8 show the manner of photographing the "sound marks" to record the notes of music played upon a piano. Each key 17 or extension thereof is provided with a rod 22 which is normally held in its raised position by a spring 23 and is adapted to be depressed by the hammer 21 when the key is struck. The rod 22 is provided with a plate 23 which is normally held in its raised position by the spring 23 and is adapted to be depressed by the hammer 21 when the key is struck. The plate 23 is provided with an opening 25 which is normally held in its raised position with the shutter 24 intercepting the rays of light from any suitable source L and preventing them from registering with an aperture 26 formed in a horizontal shelf 27. A motion picture camera 28 is suitably positioned behind the shelf 27 in line with the series of apertures 26. As the key or pedal of the piano operates the hammer 21, the rod 22 and plate 23 are moved so as to bring the opening 25 opposite the aperture 26 and allow the light from the source L to pass therethrough and be photographed by the motion picture camera 28. The film of the camera 28 must be moved at the same speed for the purpose of photographing the "sound marks" 3, as when the camera is used for the purpose of photographing the corresponding scene to be reproduced. While the "sound marks" 3 are being made by photographing the light intermittently passing through the aperture 26, the picture part of the film in camera 28 is screened by a blind or shutter so as to remain unexposed. In this manner the "sound marks" 3 are photographed only on the narrow strip of the film shown in Fig. 3.

In order to secure the best results it has been found advisable to have a motion picture positive properly pieced and joined so as to be ready for projecting and exhibiting before recording on the film in camera 28 the rows of "sound marks" that are to accompany the animated picture. This positive should contain on it blank spaces in the position of 3, Fig. 1. On the completed positive ready for the market these blank spaces will be filled in by rows of sound marks, and the spaces for the pictures by the pictures, which can be effected by such a method as printing the positive from the two superimposed negatives, as will be hereinafter described. The pianist or musician, who is to play the accompaniment to be recorded for the picture, watches the positive picture as it is projected on the screen before him from a motion picture apparatus at a definite speed. After he has become familiar with the picture, the positive is again projected through the motion picture apparatus and he then plays the accompaniment to the picture, introducing whatever melodies, chords, compositions or sound effects he thinks appropriate to the action of the objects or characters in the picture. The instrument which he operates is [illegible]

In the drawings:—

Figure 1 is a diagrammatic view illustrating one embodiment of the present invention.

Fig. 2 is a diagram showing the electrical connections for the same more in detail.

Fig. 3 is a portion of a film of usual type having one arrangement of "sound marks" photographed thereon.

Fig. 4 illustrates diagrammatically a modified arrangement involving the use of two separate films driven synchronously.

Fig. 5 is a diagrammatic plan view illustrating a further modified arrangement involving the use of a double width film.

Fig. 6 illustrates the arrangement of Fig. 5, shown in side elevation.

Figs. 7 and 8 illustrate diagrammatically in side and front elevational views respectively the apparatus used in recording the "sound marks" on a film.

Fig. 9 illustrates diagrammatically take-up mechanism used to move the film at a constant speed before the projecting apparatus.

Fig. 10 illustrates diagrammatically an arrangement for sustaining the connecting of the electric circuits until the next consecutive row of "sound marks" is before the projecting lens.

Fig. 11 is a modified form of film.

Fig. 12 illustrates the screen 12.

The invention will first be described in connection with the method illustrated by the diagrammatic views, Figs. 1, 2 and 3, in which a series of "sound marks" are recorded on a small section of the ordinary picture film. Fig. 3 shows a fragmental strip 1 of an ordinary motion picture film, having the usual transverse sections 2 on which there is no photograph or marking. In addition this view shows horizontal rows of "sound marks" 3, located immediately above the picture 4 and below the section or blank strip 2. It is obvious that the "sound marks" 3 could be located equally well below the picture rather than above. These "sound marks" consist of a series of translucent, transparent or white spaces, photographed on a darkened surface in the form of parallel lines extending in a direction parallel to the length of the film. The purpose of these "sound marks" is to permit rays of light from the lens of the projecting machine to pass through when the picture film is being projected upon a screen. The manner in which these lines or "sound marks" are photographed on the film will be described in detail in another part of

motion picture machine 5, with its lens 6 and shutter 6′ is suitably located so as to project the pictures on the object screen 7, 8 representing the cone of light rays passing from the lens to the screen. A shelf 9 is placed at a suitable point between the lens 6 and screen 7, or at the screen 7, so as to intercept the rays of light 10 coming from the film through the "sound marks" 3. The shelf 9 contains a plurality of selenium cells or plates 11 arranged in a horizontal row corresponding in number and arrangement to the "sound marks" 3 on the film. A slotted screen or grating 12 may be properly positioned in front of the shelf 9 for the purpose of reducing the magnified light rays coming from the "sound marks" and preventing overlapping of the rays on the selenium surfaces. Each particular "sound mark" 3 on the film has a corresponding selenium cell 11 on the shelf 9, upon which it is adapted to impinge a ray of light as it passes between the light source and the lens of the projecting machine. When, for example, it is desired to apply the invention for the purpose of operating a player piano, eighty-eight "sound marks" 3 are provided, one for each note of the piano and additional "sound marks" for expression levers. The number and arrangement of these "sound marks" can be varied at will according to the number and variety of sound instruments it is desired to operate.

As previously pointed out, the rays of light 10 being dispersed and directed through the "sound marks" 3 and then reduced by the slits of the grating 12, are directed upon the corresponding selenium cells 11. These latter are each connected with a battery 13 in series with a corresponding relay 14, which in turn are connected through a second battery 15, each to a corresponding electro-magnet 16 adapted to operate a control lever 17 of a piano key, expression pedal, drum stick or other sound producing instrument. It is well known that selenium, when exposed to a concentrated ray of light, changes its conductivity with a resultant lowering of its electrical resistivity. This electro-physical change is relied on for the purpose of closing the electric circuit, including battery 15 and the energization of the corresponding electro-magnet.

The exact system of electrical connections may be varied by providing, for instance, a single battery instead of the individual ones 13 to operate any of the selenium cells 11 on which the light might fall, or again battery 15 could be replaced by a number of small

trary point in the path of the light rays coming through the "sound marks" 3, either at or near the screen 7, or at a point about midway between the screen and the lens (as shown in Fig. 1), or near the operator's room. In order to effect the different locations of the shelf 9, a mirror may be placed in the path of the projected light rays so as to reflect them at any desired angle. A special lens may be placed near the projecting camera, through which the light rays are passed and dispersed so as to allow the shelf 9 to be placed within a comparatively short distance of the projecting lens of the motion picture machine.

Instead of using a separate selenium cell for each "sound mark" as proposed, a single structure may be used with an exposed selenium surface which is divided lengthwise electrically into as many sections as there are sounds and expressions to be operated by tapping off at regular intervals and connecting separately with the sources of current, relays, electro-magnets and corresponding sound instruments and expression levers to be operated. A shelf of thin partitions placed before the subdivided selenium surface would prevent the interference of the light ray coming from a "sound mark" with any selenium surface subdivision except its corresponding one.

The method of photographing the "sound marks" 3, as used in the method illustrated in Figs. 1 to 3, will next be described in detail and reference is made to Figs. 7 and 8 of the drawing. The rows of "sound marks" are photographed onto the picture film by a motion picture camera, the film of which is moved intermittently as is done in photographing an ordinary motion picture scene. It is absolutely necessary that the film be moved, while the "sound marks" are being photographed, at exactly the same speed at which the picture film, of which they are to control the accompanying sounds and music, is moved. By way of illustration, Figs. 7 and 8 show the manner of photographing the "sound marks" to record the notes of music played upon a piano. Each key 17 or expression pedal 18 of a piano 20, or other instrument the sound of which is to be recorded, operates a hammer 21, or corresponding part of another instrument, and at the same time moves a rod 22, which in this case is moved vertically. At the upper end of the rod 22 a plate 23 is carried, provided with blind or shuter part 24 and a corresponding opening 25 located immediately below the same. The plate 23 is adapted to normally

26. As the key or pedal of the piano operates the hammer 21, the rod 22 and plate 23 are moved so as to bring the opening 25 opposite the aperture 26 and allow the light from the source L to pass therethrough and be photographed by the motion picture camera 28. The film of the camera 28 must be moved at the same speed for the purpose of photographing the "sound marks" 3, as when the camera is used for the purpose of photographing the corresponding scene to be reproduced. While the "sound marks" 3 are being made by photographing the light intermittently passing through the aperture 26, the picture part of the film in camera 28 is screened by a blind or shutter so as to remain unexposed. In this manner the "sound marks" 3 are photographed only on the narrow strip of the film shown in Fig. 3.

In order to secure the best results it has been found advisable to have a motion picture positive properly pieced and joined so as to be ready for projecting and exhibiting before recording on the film in camera 28 the rows of "sound marks" that are to accompany the animated picture. This positive should contain on it blank spaces in the position of 3, Fig. 1. On the completed positive ready for the market these blank spaces will be filled in by rows of sound marks, and the spaces for the pictures by the pictures, which can be effected by such a method as printing the positive from the two superimposed negatives, as will be hereinafter described. The pianist or musician, who is to play the accompaniment to be recorded for the picture, watches the positive picture as it is projected on the screen before him from a motion picture apparatus at a definite speed. After he has become familiar with the picture, the positive is again projected through the motion picture apparatus and he then plays the accompaniment to the picture, introducing whatever melodies, chords, compositions or sound effects he thinks appropriate to the action of the objects or characters in the picture. The instrument which he operates is connected and controlled by the mechanisms just described in connection with Figs. 7 and 8, and the "sound marks", corresponding to the sounds and expressions produced, are recorded on the film of camera 28, it being understood that this camera is operated at precisely the same speed at which the picture projecting machine was operated. A developed negative containing the rows of "sound marks", but on which the spaces for the pictures are blank, is superimposed upon

a developed negative properly pieced and joined and having the pictures photographed thereon but having spaces for the "sound marks" left blank, and a print is made from this combined negative which will give a positive containing the pictures 4 and the corresponding rows of "sound marks" 3, shown in Fig. 3.

Another method by which these rows of "sound marks" 3 may be recorded so as to appear as shown in Fig. 3, is by making a marked or perforated roll of the music and sounds, such as is used in player pianos and automatic musical instruments. This roll is then moved in the direction of its length at the proper speed and is photographed through a slit by a motion picture camera, on the film of which the spaces for the pictures are not exposed to the light. The finished positive containing the pictures and "sound marks" in their proper positions may then be made by superimposing two negatives, as above described.

The method of photographing the "sound marks" 3 by the use of the motion picture camera necessarily involves a series of intermittent exposures, due to the operation of the motion picture camera shutter. It will be seen that some of the notes so photographed or marked will be of such length as to be recorded by "sound marks" extending over several consecutive pictures, while others may be of such brief duration as to be represented by "sound marks" contained on only one or two consecutive pictures. It is necessary to have the individual electric circuits so adjusted as to be sufficiently sluggish and therefore not disconnect the current when a certain "sound mark" is continued over two or more consecutive pictures, otherwise the note or sound which was intended to be sustained would not be reproduced continuously. On the other hand, the circuits must be so adjusted as to disconnect whenever their corresponding "sound mark" does not accompany a picture.

One method by which the circuits operating the electro-magnets can be made to hold over without disconnecting the current until the next consecutive row of "sound marks" is in position before the lens, is illustrated by the use of the apparatus shown in Fig. 10. [illegible] is equipped with two bars 51

moment light from the next row of "sound marks" is projected to the selenium cells. Each note, expression lever or sound hammer 57 when operated or sounded makes contact with separate contact points 58 and 59. Contact points 58 are connected by a battery 60 or other source of current to the switch 54 at the shutter and the other wire 55 running from the switch 54 connects with a pole of each electro-magnet 61. The other pole of each electro-magnet is connected by a separate wire 62 to its respective contact point 59. 63 shows the positions of the keys when a piano is used. By this method whenever a sound or expression instrumentality is operated or sounded, each of the particular sounds or expressions is sustained until the next consecutive row of "sound marks" is in position before the projecting lens. The sustaining of the sounds and expressions is effected while the light falling on their corresponding selenium cells is screened off by the opaque sections of the shutter.

A further method of keeping the electro-magnet circuits from disconnecting until the next consecutive picture is in proper position before the lens, is to have the film made with the "sound marks" recorded thereon as shown in Fig. 11. This form of film is practically the same as that shown in Fig. 3, except that in the present form there are additional rows of "sound marks" 2^a, 2^b, etc., in the spaces which, in ordinary films, exist between the pictures. The "sound marks" 2^a are the same as those indicated at 3^a and the "sound marks" at 2^b are the same as those indicated at 3^b, etc. These identical rows of "sound marks" are always separated by the same number of pictures. In allowing the rays of light to pass through the "sound marks" a secondary projecting lens is used which is also focused on the selenium cells. This secondary lens is used only for the "sound marks" 2^a, 2^b, etc., and the main projecting lens is used to allow the rays of light to pass through the "sound marks" 3^a, 3^b, etc. As the rays of light from main lens passes through the "sound marks" 3^a, "sound marks" 2^a appear in position before the secondary lens. As soon as the shutter is about to screen off marks 3^a then the rays of light from the secondary lens passes through 2^a

By the methods just described the action in the motion picture will be synchronous with the accompanying sounds. Should the film break, as happens in operating motion picture machines now in use and should the operator piece together the broken film, the sound and action on the mended film will still remain synchronous, even though one or more pictures of the film be left off as the corresponding "sound marks" for the accompanying sound will have been removed with the pictures.

The method in which the "sound marks" are photographed on a separate film adapted to be continuously driven and geared to the sprocket turning the picture film will next be described. As shown in Fig. 4, a separate film 29 is used for the "sound marks" and instead of having them formed in rows between the pictures, as described in connection with Figs. 1 to 3, the marks for each note, expression element or sound instrument are continuous. The "sound marks" 3′ consist of transparent marks parallel to the direction of the length of the film and vary in length in direct proportion to the length or duration of the sound which they represent. Here the "sound marks" 3′ are similar in appearance to the slits or perforations of the ordinary music roll used in player pianos and automatic musical instruments of that type. This sound film 29 can be photographed from an operating piano or mechanism, such as illustrated in Fig. 7 and described in connection therewith, except that the reel in the photographing camera 28 must move before the lens at a constant continuous speed and not intermittently and with no shutter interference. This can be done by removing the shutter and intermittent sprocket mechanism of the ordinary motion picture machine. As described in connection with the method illustrated in Figs. 1 to 3 and 7 and 8, this film may be made by first making a perforated roll of the sound accompaniment, such as is used for player pianos and then while this roll is moving in the direction of its length and at the proper speed, photographing it through a slit by a motion picture camera from which the shutter and intermittent sprocket mechanism have been removed. The mechanism holding the film 29, mittent manner before the projecting lens used in exhibiting motion pictures and will be thus projected to the screen. The accompanying sound film, however, must move at a constant continuous speed before the lens, which is to project the rays of light through the "sound marks" 3′ on to their respective selenium cells. This can be effected by a take-up mechanism shown in section in Fig. 9. Here the film of "sound marks" 29 unwinds from the spool 33 at an intermittent speed proportionate to the intermittent speed of the picture film 32 to which it is geared. It then passes over sprocket 34 behind a guide bar 35 to form a loop 36 back of a second guide bar 37 and over a second sprocket 38 and then moves at a constant continuous speed in front of a projecting lens 39, which projects and disperses the rays penetrating the "sound marks" 3′ to their corresponding selenium cells located in the path of these rays and connected to their corresponding source of current, relay, electromagnets, and sound producing instruments, as hereinbefore described. If the sprocket 38 is turning at a constant continuous speed it will allow the sound film to pass at such speed before its projecting lens 39, while the loop 36 of the film will decrease and increase in size and supply sufficient lengths of the film, to permit of this constant continuous speed over sprocket 38 and yet allow the film to pass intermittently over sprocket 34 in the direction of the arrow *a*.

Should the sound or picture film described in this method break, to maintain synchronism in the operating of the two films, it would be necessary in repairing the broken film to add a proportionate amount of blank film and thereby keep both films of the original proportionate length.

Referring to Figs. 5 and 6, the invention is shown as applied to a film of double width, one-half of which contains the pictures 38 while the other half contains the "sound marks" 3^2 formed similarly to those illustrated and described in connection with Fig. 4: The film 40 in this instance, is provided with an additional row of perforations 41 to fit cogs on the mechanism in order to prevent buckling of the film in operating it through the projecting ma-

shown in Fig. 3.

Another method by which these rows of "sound marks" 3 may be recorded so as to appear as shown in Fig. 3, is by making a marked or perforated roll of the music and sounds, such as is used in player pianos and automatic musical instruments. This roll is then moved in the direction of its length at the proper speed and is photographed through a slit by a motion picture camera, on the film of which the spaces for the pictures are not exposed to the light. The finished positive containing the pictures and "sound marks" in their proper positions may then be made by superimposing two negatives, as above described.

The method of photographing the "sound marks" 3 by the use of the motion picture camera necessarily involves a series of intermittent exposures, due to the operation of the motion picture camera shutter. It will be seen that some of the notes so photographed or marked will be of such length as to be recorded by "sound marks" extending over several consecutive pictures, while others may be of such brief duration as to be represented by "sound marks" contained on only one or two consecutive pictures. It is necessary to have the individual electric circuits so adjusted as to be sufficiently sluggish and therefore not disconnect the current when a certain "sound mark" is continued over two or more consecutive pictures, otherwise the note or sound which was intended to be sustained would not be reproduced continuously. On the other hand, the circuits must be so adjusted as to disconnect whenever their corresponding "sound mark" does not accompany a picture.

One method by which the circuits operating the electro-magnets can be made to hold over without disconnecting the current until the next consecutive row of "sound marks" is in position before the lens, is illustrated by the use of the apparatus shown in Fig. 10. The shutter 50 is equipped with two lugs 51 and 52 located as shown in Fig. 10, so that when the shutter 50 revolves before the projecting lens 53 they operate a switch 54 which makes and breaks the current flowing through wires 55 and 56. Lug 51 closes the circuit so that the electro-magnets energized by the "sound marks" 3 on the picture before the projecting lens remain energized until the film has passed behind the shutter and the next consecutive picture and row of "sound marks" is before the projecting lens; then lug 52 disconnects the current, at which

or other source of current to the switch 54 at the shutter and the other wire 55 running from the switch 54 connects with a pole of each electro-magnet 61. The other pole of each electro-magnet is connected by a separate wire 62 to its respective contact point 59. 63 shows the positions of the keys when a piano is used. By this method whenever a sound or expression instrumentality is operated or sounded, each of the particular sounds or expressions is sustained until the next consecutive row of "sound marks" is in position before the projecting lens. The sustaining of the sounds and expressions is effected while the light falling on their corresponding selenium cells is screened off by the opaque sections of the shutter.

A further method of keeping the electro-magnet circuits from disconnecting until the next consecutive picture is in proper position before the lens, is to have the film made with the "sound marks" recorded thereon as shown in Fig. 11. This form of film is practically the same as that shown in Fig. 3, except that in the present form there are additional rows of "sound marks" 2^a, 2^b, etc., in the spaces which, in ordinary films, exist between the pictures. The "sound marks" 2^a are the same as those indicated at 3^a and the "sound marks" at 2^b are the same as those indicated at 3^b, etc. These identical rows of "sound marks" are always separated by the same number of pictures. In allowing the rays of light to pass through the "sound marks" a secondary projecting lens is used which is also focused on the selenium cells. This secondary lens is used only for the "sound marks" 2^a, 2^b, etc., and the main projecting lens is used to allow the rays of light to pass through the "sound marks" 3^a, 3^b, etc. As the rays of light from main lens passes through the "sound marks" 3^a, "sound marks" 2^a appear in position before the secondary lens. As soon as the shutter is about to screen off marks 3^a then the rays of light from the secondary lens passes through 2^a and thus the identical marks are projected and superimposed on the selenium cells. This row of marks 2^a remains before the secondary lens until 3^b have replaced 3^a before the main projecting lens, then a shutter screens off 2^a and in a similar manner 2^b next appear before the secondary projecting lens. In this manner, although the film is moving intermittently before the main lens, yet the selenium cells are properly kept in the path of the light until the next row of "sound marks" is in position before the main lens.

still remain synchronous, even though one or more pictures of the film be left off as the corresponding "sound marks" for the accompanying sound will have been removed with the pictures.

The method in which the "sound marks" are photographed on a separate film adapted to be continuously driven and geared to the sprocket turning the picture film will next be described. As shown in Fig. 4, a separate film 29 is used for the "sound marks" and instead of having them formed in rows between the pictures, as described in connection with Figs. 1 to 3, the marks for each note, expression element or sound instrument are continuous. The "sound marks" 3′ consist of transparent marks parallel to the direction of the length of the film and vary in length in direct proportion to the length or duration of the sound which they represent. Here the "sound marks" 3′ are similar in appearance to the slits or perforations of the ordinary music roll used in player pianos and automatic musical instruments of that type. This sound film 29 can be photographed from an operating piano or mechanism, such as illustrated in Fig. 7 and described in connection therewith, except that the reel in the photographing camera 28 must move before the lens at a constant continuous speed and not intermittently and with no shutter interference. This can be done by removing the shutter and intermittent sprocket mechanism of the ordinary motion picture machine. As described in connection with the method illustrated in Figs. 1 to 3 and 7 and 8, this film may be made by first making a perforated roll of the sound accompaniment, such as is used for player pianos and then while this roll is moving in the direction of its length and at the proper speed, photographing it through a slit by a motion picture camera from which the shutter and intermittent sprocket mechanism have been removed. The mechanism holding the film 29, having the "sound marks" photographed thereon, is geared to the sprocket 30, by suitable mechanism 31, of the picture film 32, or it is geared to a mechanism adapted to turn the sound film at the same speed at which it was moving when photographed and thus produce the sounds synchronously with the accompanying pictures. It will be understood that separate lenses are used for the purpose of projecting the pictures of the film 32 and the "sound marks" 3′ of the film 29. The film 32 will operate in the interselenium cells. This can be effected by a take-up mechanism shown in section in Fig. 9. Here the film of "sound marks" 29 unwinds from the spool 33 at an intermittent speed proportionate to the intermittent speed of the picture film 32 to which it is geared. It then passes over sprocket 34 behind a guide bar 35 to form a loop 36 back of a second guide bar 37 and over a second sprocket 38 and then moves at a constant continuous speed in front of a projecting lens 39, which projects and disperses the rays penetrating the "sound marks" 3′ to their corresponding selenium cells located in the path of these rays and connected to their corresponding source of current, relay, electromagnets, and sound producing instruments, as hereinbefore described. If the sprocket 38 is turning at a constant continuous speed it will allow the sound film to pass at such speed before its projecting lens 39, while the loop 36 of the film will decrease and increase in size and supply sufficient lengths of the film, to permit of this constant continuous speed over sprocket 38 and yet allow the film to pass intermittently over sprocket 34 in the direction of the arrow *a*.

Should the sound or picture film described in this method break, to maintain synchronism in the operating of the two films, it would be necessary in repairing the broken film to add a proportionate amount of blank film and thereby keep both films of the original proportionate length.

Referring to Figs. 5 and 6, the invention is shown as applied to a film of double width, one-half of which contains the pictures 38 while the other half contains the "sound marks" 3² formed similarly to those illustrated and described in connection with Fig. 4: The film 40 in this instance, is provided with an additional row of perforations 41 to fit cogs on the mechanism in order to prevent buckling of the film in operating it through the projecting machine. The film could be made in a manner similar to that described in connection with the method illustrated by Fig. 4 but it will be necessary in projecting this film to have the "sound marks" moved at a constant continuous speed before its projecting lens, while the pictures must be moved before the lens which projects them in the intermittent manner usually employed in projecting motion pictures. A convenient way to obtain the film 40 is to first photograph a negative of the original sound film and place it side

by side with a finished and pieced negative of the corresponding picture film, then from the two print a one piece double width positive, such as shown in Fig. 5. The "sound marks" do not neces-arily have to be immediately opposite or adjacent to the particular picture or pictures which they are to accompany in order to have synchronism between the two in projecting. The "sound marks" 3^2 do not pass in front of the lens 42 but to one side of it and consequently are not projected by it. The lens 42 is used to project the pictures as the film 40 comes from the reel 43. After passing the lens 42 the film passes over a take-up mechanism similar to that shown and described in connection with Fig. 9, except that in the present case the sprocket 44, bars 45 and 46, and sprocket 47 are broad enough to accommodate the widened film containing both the pictures and the "sound marks" adjacent to one another. From the take-up mechanism the film passes before the lens 48 and is wound upon reel 49. Lens 48 is used for projecting the rays of light through the "sound marks" and is offset to one side of lens 42. On passing over the sprocket 47 the film is moved at a constant continuous speed instead of intermittently as when passing before lens 42. It will thus be seen that from this arrangement the pictures 38' are intermittently fed so as to be projected by the lens 42 while the "sound marks" 3^2 are passing simultaneously to one side of the lens and therefore not receiving light therefrom. Then later as the film moves with a continuous constant motion before lens 48, the rays of light pass through the "sound marks" 3^2 while the pictures are moving to one side of the lens and receive no light therefrom.

Should the operator have reason to mend a broken film, such as is used in this method, the synchronism of sound and action will not be destroyed in operating the mended film, for every section of the picture film removed a corresponding length of the sound film could be removed.

While I have shown the present invention as applied for the purpose of reproducing sounds, such as the playing of a piano, etc., it is to be understood that the invention is not limited to the particular examples illustrated and described in the present case, as

chronously with the actions in a motion picture film that is being projected, consisting in photographing upon a film sound marks in given relation to the pictures, simultaneously projecting the pictures and rays of light through the sound marks, whereby the pictures will be thrown on a screen and the light from the sound marks will be directed upon selenium cells to close electric circuits and operate suitable sound producing instruments.

2. The herein described method of producing musical sounds and the like synchronously with the actions in a motion picture that is being projected, consisting in photographing pictures on certain portions of a picture film, recording rows of sound marks on other parts of the film, and simultaneously projecting the pictures upon a screen and rays of light through the sound marks upon the light operated means controlling certain sound producing instruments.

3. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising, a film having picture scenes and sound marks photographed thereon, means for simultaneously projecting the pictures and rays of light through the sound marks, sound producing instruments, and light controlled means upon which the sound marks are projected for operating said sound producing instruments.

4. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a film having sound marks and pictures contained thereon in a given relation, sound producing instruments, light operated means adapted to operate said instruments, and means for simultaneously projecting said pictures and rays of light through said sound marks onto said light operated means.

5. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a picture film having sound marks thereon, sound producing instruments, electro-magnetic operating means therefor, electric circuits including said electro-magnetic means, light-operated means for closing and opening said circuits, and means for simultaneously projecting the pictures and light

taneously projecting the pictures and rays of light passing through said sound marks on to said selenium cells for opening and closing said circuits.

7. A motion picture machine comprising in combination, a plurality of independently operable sound producing elements, and light operated means automatically controlled by the film for independently operating said elements synchronously with the actions of the pictures.

8. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a picture-film having horizontal rows of transparent sound marks on sections thereof immediately preceding each picture, sound producing instruments, electro-magnetic means for actuating said instruments, a plurality of selenium cells, electric circuits including said selenium cells and electro-magnets, light operated means for opening and closing said circuits, said light operated means being adapted to be controlled by the rays of light through the sound marks.

9. Apparatus for synchronously producing musical sounds and the like to ac
pany the projection of motion pictures
prising a picture-film having horiz
rows of transparent sound marks on
tions thereof between the pictures, s
producing instruments, electro-ma
operating means therefor, electric ci
including said electro-magnetic means,
operated means for closing and openin
circuits, said light operated means
adapted to be controlled by the rays o
through the sound marks.

10. Apparatus for synchronously p
ing musical sounds and the like to a
pany the projection of motion picture
prising a film having picture scene
sound marks photographed thereon,
for simultaneously projecting the p
and rays of light through the sound
means for reducing the magnified lig
from the sound marks, sound produci
struments, and light controlled means
which the sound marks are project
operating said sound producing instru

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h a finished and pieced negative sponding picture film, then from nt a one piece double width posi- s shown in Fig. 5. The "sound not neces-arily have to be imme- osite or adjacent to the particu- or pictures which they are to in order to have synchronism two in projecting. The "sound do not pass in front of the lens ne side of it and consequently jected by it. The lens 42 is used he pictures as the film 40 comes eel 43. After passing the lens passes over a take-up mechanism hat shown and described in con- h Fig. 9, except that in the pres- e sprocket 44, bars 45 and 46, et 47 are broad enough to ac- the widened film containing ictures and the "sound marks" one another. From the take-up the film passes before the lens round upon reel 49. Lens 48 is jecting the rays of light through marks" and is offset to one side On passing over the sprocket 47 moved at a constant continuous ad of intermittently as when ore lens 42. It will thus be seen his arrangement the pictures 38' ently fed so as to be projected 42 while the "sound marks" 3² simultaneously to one side of d therefore not receiving light Then later as the film moves nuous constant motion before rays of light pass through the ks" 3² while the pictures are mov- ide of the lens and receive no om.

operator have reason to mend n, such as is used in this method, hism of sound and action will oved in operating the mended ry section of the picture film responding length of the sound removed.

ve shown the pre-ent invention r the purpose of reproducing as the playing of a piano, etc., derstood that the invention is the particular examples illus- scribed in the present case, as

chronously with the actions in a motion picture film that is being projected, consisting in photographing upon a film sound marks in given relation to the pictures, simultaneously projecting the pictures and rays of light through the sound marks, whereby the pictures will be thrown on a screen and the light from the sound marks will be directed upon selenium cells to close electric circuits and operate suitable sound producing instruments.

2. The herein described method of producing musical sounds and the like synchronously with the actions in a motion picture that is being projected, consisting in photographing pictures on certain portions of a picture film, recording rows of sound marks on other parts of the film, and simultaneously projecting the pictures upon a screen and rays of light through the sound marks upon the light operated means controlling certain sound producing instruments.

3. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising, a film having picture scenes and sound marks photographed thereon, means for simultaneously projecting the pictures and rays of light through the sound marks, sound producing instruments, and light controlled means upon which the sound marks are projected for operating said sound producing instruments.

4. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a film having sound marks and pictures contained thereon in a given relation, sound producing instruments, light operated means adapted to operate said instruments, and means for simultaneously projecting said pictures and rays of light through said sound marks onto said light operated means.

5. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a picture film having sound marks thereon, sound producing instruments, electro-magnetic operating means therefor, electric circuits including said electro-magnetic means, light-operated means for closing and opening said circuits, and means for simultaneously projecting the pictures and light through the sound marks on to said light

taneously projecting the pictures and rays of light passing through said sound marks on to said selenium cells for opening and closing said circuits.

7. A motion picture machine comprising in combination, a plurality of independently operable sound producing elements, and light operated means automatically controlled by the film for independently operating said elements synchronously with the actions of the pictures.

8. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a picture-film having horizontal rows of transparent sound marks on sections thereof immediately preceding each picture, sound producing instruments, electro-magnetic means for actuating said instruments, a plurality of selenium cells, electric circuits including said selenium cells and electro-magnets, light operated means for opening and closing said circuits, said light operated means being adapted to be controlled by the rays of light through the sound marks.

9. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a picture-film having horizontal rows of transparent sound marks on sections thereof between the pictures, sound producing instruments, electro-magnetic operating means therefor, electric circuits including said electro-magnetic means, light operated means for closing and opening said circuits, said light operated means being adapted to be controlled by the rays of light through the sound marks.

10. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a film having picture scenes and sound marks photographed thereon, means for simultaneously projecting the pictures and rays of light through the sound marks, means for reducing the magnified light rays from the sound marks, sound producing instruments, and light controlled means upon which the sound marks are projected for operating said sound producing instruments.

In testimony whereof I affix my signature.

ELMER LEWIS GREENSFELDER.

between the two in projecting. The "sound marks" 3^2 do not pass in front of the lens 42 but to one side of it and consequently are not projected by it. The lens 42 is used to project the pictures as the film 40 comes from the reel 43. After passing the lens 42 the film passes over a take-up mechanism similar to that shown and described in connection with Fig. 9, except that in the present case the sprocket 44, bars 45 and 46, and sprocket 47 are broad enough to accommodate the widened film containing both the pictures and the "sound marks" adjacent to one another. From the take-up mechanism the film passes before the lens 48 and is wound upon reel 49. Lens 48 is used for projecting the rays of light through the "sound marks" and is offset to one side of lens 42. On passing over the sprocket 47 the film is moved at a constant continuous speed instead of intermittently as when passing before lens 42. It will thus be seen that from this arrangement the pictures 38′ are intermittently fed so as to be projected by the lens 42 while the "sound marks" 3^2 are passing simultaneously to one side of the lens and therefore not receiving light therefrom. Then later as the film moves with a continuous constant motion before lens 48, the rays of light pass through the "sound marks" 3^2 while the pictures are moving to one side of the lens and receive no light therefrom.

Should the operator have reason to mend a broken film, such as is used in this method, the synchronism of sound and action will not be destroyed in operating the mended film, for every section of the picture film removed a corresponding length of the sound film could be removed.

While I have shown the present invention as applied for the purpose of reproducing sounds, such as the playing of a piano, etc., it is to be understood that the invention is not limited to the particular examples illustrated and described in the present case, as various other instruments and sound producing mechanisms can be equally well operated by the use of this method, the electro-magnets either depressing the notes and expression pedals as described or controlling stops in front of tracker-board apertures in electrically operated instruments.

Having described my invention what I claim is:—

1. The hereindescribed method of producing musical sounds and the like synchronously with the actions in a motion picture that is being projected, consisting in photographing pictures on certain portions of a picture film, recording rows of sound marks on other parts of the film, and simultaneously projecting the pictures upon a screen and rays of light through the sound marks upon the light operated means controlling certain sound producing instruments, the light from the sound marks will be directed upon selenium cells to close electric circuits and operate suitable sound producing instruments.

2. The herein described method of producing musical sounds and the like synchronously with the actions in a motion picture that is being projected, consisting in photographing pictures on certain portions of a picture film, recording rows of sound marks on other parts of the film, and simultaneously projecting the pictures upon a screen and rays of light through the sound marks upon the light operated means controlling certain sound producing instruments.

3. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising, a film having picture scenes and sound marks photographed thereon, means for simultaneously projecting the pictures and rays of light through the sound marks, sound producing instruments, and light controlled means upon which the sound marks are projected for operating said sound producing instruments.

4. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a film having sound marks and pictures contained thereon in a given relation, sound producing instruments, light operated means adapted to operate said instruments, and means for simultaneously projecting said pictures and rays of light through said sound marks onto said light operated means.

5. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a picture film having sound marks thereon, sound producing instruments, electro-magnetic operating means therefor, electric circuits including said electro-magnetic means, light-operated means for closing and opening said circuits, and means for simultaneously projecting the pictures and light through the sound marks on to said light-operated means.

6. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a picture film having sound marks thereon, sound producing instruments, electro-magnetic means for actuating said instruments, a plurality of selenium cells, electric circuits including said selenium cells and electro-magnets, and means for simul-

light operated means automatically controlled by the film for independently operating said elements synchronously with the actions of the pictures.

8. Apparatus for synchronously producing musical sounds and the like to accompany the projection of motion pictures comprising a picture-film having horizontal rows of transparent sound marks on sections thereof immediately preceding each picture, sound producing instruments, electro-magnetic means for actuating said instruments, a plurality of selenium cells, electric circuits including said selenium cells and electro-magnets, light operated means for opening and closing said circuits, said light operated means being adapted to be controlled by the rays of light through the sound marks.

9. Apparatus for synchronously produc- including said electro-magnetic means, l operated means for closing and opening circuits, said light operated means b adapted to be controlled by the rays of l through the sound marks.

10. Apparatus for synchronously pro ing musical sounds and the like to ac pany the projection of motion pictures c prising a film having picture scenes sound marks photographed thereon, m for simultaneously projecting the pict and rays of light through the sound m means for reducing the magnified light from the sound marks, sound producin struments, and light controlled means which the sound marks are projected operating said sound producing instrum

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ELMER LEWIS GREENSFELD

[fol. 101] MOTION TO SHIFT BURDEN OF PROOF—March 9, 1926

And now come Hans Vogt, Joseph Massolle and Josef Engl, by their attorneys, and move that the burden of proof in the above entitled interference be shifted to place the same on the party DeForest, and the times set for taking testimony be modified accordingly; this in view of the fact that applicant's application involved in said interference was filed under the International Convention, and that applicants filed an application in Germany, covering the same invention as that of their said application involved in this interference, as stated in the original oath of their said application, at a date earlier than the filing date in the United States of the party DeForest and that applicants should accordingly be given the benefit of the filing date of said corresponding German application, and also in view of the fact DeForest's patent involved in said interference was issued during the pendency of applicants' application. A certified copy of the said German application of the same inventors, as filed, V. 16431 VI/57a 2, filed on April 14, 1921, is attached herewith.

Hans Vogt, Joseph Massolle, and Josef Engl, by
Ward, Crosby and Smith, their Attorneys.

Dated, New York, N. Y., March 8, 1926.

Bescheinigung

Die Herren Hans Vogt in Berlin-Wilmersdorf, Joseph Massolle und Dr. Joseph Engl in Berlin-Grunewald, haben im Deutschen Reiche ein Gesuch um ein Erfindungspatent für ein "Verfahren zur Herstellung kombinierter Tonbildfilme" am 14. April, 1921, beim Reichspatentamt hinterlegt.

Das angeheftete Stück ist eine richtige und genaue Wiedergabe der ursprünglichen Unterlage dieser Patentanmeldung.

Berlin, den 9 Dezember, 1925.

Der Präsident des Reichspatentamts. J. V. W. Kahl.
V. 16431. VI/57a2.

[fol. 102]

Tempelhof, den 13 April, 1921.
Albrechtstrasse 104.

C. R. Forth, Oberingenieur.

Verfahren zur Herstellung kombinierter Tonbildfilme

Patentanmeldung

Bei der Herstellung sprechender Filme ist es insbesondere aus Betriebsgründen von grossem Vorteil, die Tonreihe und die Bildreihe auf einen gemeinsamen materiellen Träger (Film) aufzubringen. Bei diesem Verfahren ergeben sich aber infolge der bei der kinematographischen Aufnahme schwankenden Lichtverhältnisse häufig Unterschiede im Belichtungsgrad der Bromsilberschicht und zwar in der Weise, dass die Bildreihe über-bezw. unterbelichtet wird. Da der gleiche Film aber auch nahe an der Bildreihe die immer normal belichtete Tonzeichenreihe trägt, lassen sich bei kombinierten Negativen diese Unterschiede durch Entwicklung, Abschwächen, Verstärken etc. nicht ausgleichen. Sie lassen sich nur dadurch beheben, dass die unterbezw. überbelichteten Negativstellen eine getrennte, entsprechend abgepasste Behandlung erhalten.

Technisch ist dies so gut wie unmöglich, solange sich die beiden Ereignisreihen auf dem gleichen Film befinden.

Erfindungsgemäss wird diese Schwierigkeit dadurch beseitigt, dass zur Herstellung der Negative entweder gänzlich getrennte Filme vorgesehen sind oder solche, die bei der Aufnahme wohl zusammenhängen, vor der Entwicklung aber auseinandergetrennt werden. Der Synchronismus wird in beiden Fällen durch die Perforation und durch entsprechende Marken gewährleistet.

Die Herstellung der Positivfilme kann erfolgen, indem man die beiden Negativfilme, vorteilhaft nacheinander, auf den gleichen Positivfilm kopiert. Man kann aber auch die beiden Negativfilme vorher der Länge nach miteinander verkleben und dieses so gewonnene combinierte Negativ wie üblich kopieren.

Patentansprüche

1.) Verfahren zur Herstellung kombinierter Tonbildfilme, wobei die Ton-Bild-Positive auf einen gemeinsamen [fol. 103] Film kopiert sind dadurch gekennzeichnet, dass die Negative getrenntentwickelt werden.

2.) Verfahren zur Herstellung von kombinierten Tonbildfilmen gemäss Anspruch 1, dadurch gekennzeichnet, dass die Aufnahme der Tonzeichen und der Reihenbilder auf getrennten Filmen erfolgt.

3.) Verfahren zur Herstellung von kombinierten Tonbildfilmen gemäss Anspruch 1, dadurch gekennzeichnet, dass die Aufnahme der Tonzeichen und der Reihenbilder auf einen gemeinsamen Film erfolgt, der nachher getrennt wird.

4.) Verfahren zur Herstellung von kombinierten Tonbildfilmen gemäss Anspruch 1—3, dadurch gekennzeichnet, dass die Negative nach erfolgter Behandlung der Länge nach miteinander vereinigt werden.

R. A. Si.

Certificate

Messrs. Hans Vogt, of Berlin-Wilmersdorf, Joseph Massolle and Dr. Joseph Engl, of Berlin-Grunewald, have filed an application for a German Patent with the Imperial Patent Office, on April 14, 1921, covering "Method of making Combination Fono-films".

The document hereunto attached is a true and exact copy of the original papers of this application.

Berlin, December 9, 1925.

President of the Imp. Patent Office, by Proxy:
(Signed) W. Kahl. (Embossed Seal of German Patent Office.) V. 16431. VI/57a2.

Albrechtstrasse 104,
Tempelhof, April 13, 1921.

C. R. Forth, Chief Engineer.

Method of Making Combination Fono-Films

Patent Application

In the production of speaking films, it is, particularly for operating reasons, of great advantage to deposit or fix the fono-series and the picture-series upon a common physical carrier or support (film). However, on account of vari- [fol. 104] ations in the lighting conditions associated with cinematographic picture recording work, differences are often produced in the degree of exposure of the silver bromide coat with the result that the picture series is frequently

over- or under-exposed. However, on account of the fact that the same film carries always both the picture-series and the normally exposed fono-series close together, the said differences, in combination negatives, can not be eliminated by developing, toning down (clearing) intensification, etc. Indeed, they can only be obviated by that the under-exposed and the over-exposed portions of the negative are subjected to a separate and conveniently adapted treatment.

Technically, this is well nigh impossible as long as the two series of events are fixed upon the same film strip.

Now, according to the invention this difficulty is obviated by that for the production of the negatives either entirely distinct films are used, or else films which, while still united during the recording work, are severed prior to development. Synchronism in either case is insured by the perforation or else by corresponding datum marks.

The preparation of the positive films can be accomplished by that the two negatives, preferably one after the other, are copied upon the same positive film. However, the procedure could also be so that the two negatives are first pasted together in longitudinal direction, whereupon the combination negative thus obtained is copied in the customary manner.

Claims

1. Method of making combination fono-films in which the fono- and picture-positives are copied upon a common or joint film, characterized by that the negatives are separately developed.

2. Method of making combination fono-films according to claim 1., characterized by that the recording of the fono-series and of the picture-series is effected upon separate films.

3. Method of making combination fono-films according to claim 1., characterized by that the recording of the fono-series and of the picture-series is effected upon one and the same film strip, the latter being subsequently severed or divided.

[fol. 105] 4. Method of making combination fono-films according to claims 1. to 3., characterized by that the negatives, after treatment, are reunited with each other.

DECISION OF THE EXAMINER OF INTERFERENCES—April 13, 1926

The party Vogt, Massole and Engl moves to shift the burden of proof to the party DeForest. They base their motion on their German application, filed April 14, 1921, referred to in the oath of their application here in issue, filed March 29, 1922. As the application was filed in this country within twelve months from the date the foreign application was filed they are entitled, upon proper proof of the foreign application, to the benefits to be derived therefrom as provided by Section 4887 of the Revised Statutes.

The motion is accompanied by a certified copy of the original papers of the German patent application, and a translation of the same, in accordance with the procedure established by Steel and Steel v. Myers, 205 O. G., 1021; 1914 C. D., 74.

A comparison of the German application of Vogt, Massolle and Engl and their application here involved leads to the conclusion that they are substantially the same and that the invention as defined by the counts in issue is disclosed in their German application.

It appears that the motion should be granted. The party DeForest did not make an appearance at the hearing on this motion or file a brief opposing the motion. The motion is granted.

The order of the parties now becomes DeForest v. Vogt, Massolle and Engl.

The times for taking testimony and for final hearing are reset as follows:

Testimony in chief of DeForest to close June 12, 1926.

Testimony of Vogt, Massolle and Engl to close July 12, 1926.

Rebuttal testimony of DeForest to close July 27, 1926.

Final hearing September 28, 1926, at 11 A. M.

H. I. Houston, Examiner of Interferences.

[fol. 106] DECISION OF EXAMINER OF INTERFERENCES—July 14, 1928.

This controversy involves talking motion pictures and has to do particularly with a process for making films. It

was found that if the picture and sound were recorded directly upon the same film either one or the other would be unsatisfactory, because the same amount of light is not suitable for recording both picture and sound. According to the process of this interference the picture and sound are recorded on separate films and thereafter combined. It is to be particularly observed that each of the two counts specifies that the picture and sound are to be simultaneously photographed.

This interference was set up with DeForest as the senior party. On motion decided April 13, 1926, Vogt et al. were given the benefit of their German application date of April 14, 1921, thereupon becoming the senior party.

The invention has been patented to the party DeForest. Vogt et al. copied the two counts from the DeForest patent but they were rejected by the primary examiner. The rejection was reversed by the Examiners-in-Chief and in their opinion they mentioned the word "simultaneously" occurring in both claims as distinguishing these claims from the Greenfelder patent cited. Under the circumstances the usual rule in interferences that each limitation of the claims is to be deemed essential has particular force. The counts read as follows:

Count 1. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, and photographing the sound record on an unexposed portion of the picture film.

Count 2. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, and photographing the sound record on an unexposed portion of the picture film between the marginal edge and the sprocket perforations thereof.

The testimony submitted by DeForest fails to prove that he had conceived this feature of simultaneously photo- [fol. 107] graphing the picture and the sound prior to his filing date. The notes in the DeForest notebook relied upon do not include this feature, and the corroborating witnesses do not support DeForest with respect to this feature of simultaneity. Furthermore, these corroborating witnesses had no means of fixing the date.

Garity knows that DeForest kept a running notebook with which he was conversant in a general way, and he recognizes the two notebooks put into evidence (X Q. 41, p. 45). He states, however, in answer to X Q. 40, page 45, that he is not able to say that a particular record was made on a certain date, his memory not going back so far. The notes purport to have been made December, 1920, and January and April, 1921. Vogt et al. having a filing date under the International Convention of April 14, 1921, cannot be considered as anticipated by this testimony by Garity.

The witness Senner likewise has no way of fixing any date prior to the filing date of Vogt et al. DeForest purchased from Senner's employer on February 18, 1921, a camera, and Senner is of the impression that it was within a week or ten days after this purchase that DeForest talked with him about producing talking motion pictures. The dates here are so close, however, that the impression of the witness is not sufficiently reliable to overcome the record date of Vogt et al.

It is also true that the testimony of neither of these witnesses includes the feature of simultaneity. In fact the answer of Garity to Q. 20, p. 41, seems to contradict the thought of simultaneity, but at all events, this thought is not affirmatively present. The testimony of Torma does not appear to be regarded by DeForest as supporting his case for priority of conception.

DeForest being admittedly the last to reduce to practice, his reduction to practice consisting of the filing of his application, July 16, 1921, he could in any event prevail only if he established diligence between the German filing date of the other party and his own filing date. The German filing, as already stated, was April 14, 1921, so that DeForest would have the duty of proving diligence during this interval of three months.

It is not urged upon DeForest's behalf that he was doing anything with the present invention from Vogt et al.'s rec- [fol. 108] ord date until he submitted to his patent counsel, on June 30, 1921, the date for his application. According to the testimony of his assistant Garity an actual reduction to practice could have been made without difficulty.

It is the contention on behalf of DeForest that he was working on the problem of recording sound, and should be

credited with diligence upon the basis of this activity. But this work does not amount to diligence in reducing to practice an invention involving the combination of sound and pictures. There are authorities to the effect that diligence on a whole machine may be considered as diligence toward the elements of such machine, but the present case is not of that class and DeForest can not be credited with diligence for one invention upon the basis of what he was doing toward an independent, even if related, invention. On the ground that DeForest has established no date earlier than the record date of Vogt et al., and on the further ground that he was not diligent during the three months between Vogt et al.'s filing date and his own filing date, it is ruled that Vogt et al. are the first inventors.

Priority of invention of the subject matter in issue is hereby awarded to Hans Vogt, Joseph Massolle and Josef Engl, the senior party.

Limit of appeal: August 3, 1928.

H. I. Houston, Examiner of Interferences.

APPEAL TO THE BOARD OF APPEALS—July 18, 1928

Now comes the party DeForest by his attorneys and hereby appeals from the decision of the Examiner of Interferences dated July 14, 1928, in the above entitled interference and bases his appeal on the following grounds:

1. The Honorable Examiner of Interferences erred in awarding priority of invention to Engl, Massolle and Vogt.

2. The Honorable Examiner of Interferences erred in not awarding priority of invention to DeForest.

3. The Honorable Examiner of Interferences erred in ruling that DeForest failed to prove that he conceived the feature of simultaneously photographing the picture and sound record prior to his filing date.

[fol. 109] 4. The Honorable Examiner of Interferences erred in ruling that the testimony of DeForest as to the date*d* when he made the entries in his note book are not corroborated by Garity.

5. The Honorable Examiner of Interferences erred in ruling that the testimony of DeForest and Senner taken

together did not establish a conception of the invention before April 14, 1921, the foreign filing date of Engl, Massolle and Vogt.

6. The Honorable Examiner of Interferences erred in holding that DeForest was not diligent between the dates of April 14, 1921 and July 16, 1921, the filing date of his application.

7. The Honorable Examiner of Interferences erred in ruling that the work DeForest was doing between April 14, 1921, and July 16, 1921, should not be credited as activity to show diligence in reducing to practice the invention of this interference.

The appeal fee of $25.00 is enclosed herewith.
An oral hearing is requested.
Respectfully, Darby & Darby, Attorneys for DeForest.

Dated: New York, N. Y., July 17, 1928.

DECISION OF BOARD OF APPEALS—January 7, 1930

This is an appeal by DeForest from the decision of the Examiner of Interferences awarding priority of invention to Engl, Massolle and Vogt, the senior party, upon all the counts which read as follows:

1. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, and photographing the sound record on an unexpected portion of the picture film.

2. The method of producing talking moving pictures on the same film which comprises photographing simultaneously upon separate films the picture and the sound, and [fol. 110] photographing the sound record on an unexposed portion of the picture film between the marginal edge and the sprocket perforations thereof.

The counts are claims 1 and 3 of the patent No. 1,489,314 of DeForest and the interference was originally declared with DeForest as the senior party but upon motion, Vogt

et al., by a decision dated April 13, 1926, were given the benefit of their German application date of April 14, 1921, and made the senior party.

The Examiner of Interferences points out that Vogt et al. copied the two counts from the DeForest patent but they were rejected by the Primary Examiner. The rejection was reversed by the Board of Examiners-in-Chief, and in their opinion they mentioned the word "simultaneously" occurring in both claims as distinguishing them from the Greenfelder patent cited against them. He therefore emphasized in his decision the word "simultaneously" as an essential limitation in the claims. He held that the testimony submitted by DeForest fails to prove that he had conceived this feature of *simultaneously* photographing the picture and the sound prior to his filing date.

For proof of conception DeForest relied primarily upon his note book No. 2, DeForest Exhibit 1, in which, under date of December 28, 1920, in an entry which reads:

Developed this last 10 minutes until wholly fogged. This would be too long for cine picture. Hence will probably need to make two negatives (picture and sound) and print on same pos.

A second entry under date of Jan. 18, 1921, reads:

Developed 11 minutes (very cold day) longer development is best for sound film but not for picture. Hence will probably use 2 films.

These notes clearly indicate that as the sound and picture films require a different degree or time of development, it would be necessary to use two films and develop them separately. The Examiner of Interferences held that there was nothing in these notes to indicate that the sound and picture films were to be photographed "simultaneously" as required by the counts.

[fol. 111] DeForest, in his brief, contends that the object of the invention is to synchronize the sounds with the movement of the lips of a person in the picture and that it is at once apparent that the picture and sound must be recorded simultaneously. He further points out that on the motion to shift the burden of proof, the Law Examiner gave to Engl et al. the benefit of the filing date of his German application and if it be held that DeForest's testimony

fails to support the issues, it is equally true that the German application of Engl et al. fails in the same respect.

In the German application we find the following:

> According to the invention this difficulty is obviated in that for the making of the negatives either entirely separate films are provided or those which although still united during the recording are, however, detached from each other before the developing. Synchronism in both cases is insured by perforation and by suitable marks.

In our opinion the statements that the films are still united during the recording indicates that the record is made simultaneously on both films and this is further borne out by the statement that, when separated for development purposes, the synchronization is insured by perforations and suitable marks so that they can be reconnected with proper registration. The same disclosure is found in the U. S. application of Engl et al.

As to the DeForest testimony, it appears that the reason why two films were to be used was that different degrees of development were necessary for the sound and picture negatives and it might seem obvious that the original idea which rendered this change necessary was that the sound and pictures were supposed to be photographed simultaneously. At this time only sound had been photographed in the laboratory which may be the reason why nothing was said in the notes as to simultaneous photography of the sound and picture. While the simultaneous exposure of the sound and picture negatives would seem to be the most obvious procedure, the brief of Engl et al. points out that other methods were known prior to DeForest's alleged conception, (see Engl et al. brief, pages 24 and 25,) and appear to be disclosed in the patent to Greenfelder, No. 1,254,684, which was cited in the application of Engl et al., and the [fol. 112] burden was on DeForest, as the junior party, to prove his case. Furthermore, he must rely for corroboration upon his witnesses Garity and Senner. Garity has no way of fixing the dates when the entries were made in the note books and these dates are fixed only by DeForest's own testimony. Garity merely knows that he saw the note books between December, 1920, and prior to DeForest's trip to Germany the last of July, 1921, and that, at some time, DeForest discussed the subject matter of the notes

with him. Senner can fix no date except with relation to the purchase of a camera from him on February 18, 1921, and thinks that DeForest, within a week or ten days thereafter, brought some films to him for development which films contained both sound and picture records which were of unequal exposure. DeForest suggested that it would be best to use separate negatives while he discouraged this method and suggested the use of light of different intensity in making the records. This disclosure does not mention "simultaneous" exposure and the time between about March 1 and April 14, 1921, when Engl et al. entered the field is so short that a person testifying six or seven years after the event could hardly fix the time with sufficient definiteness. DeForest says (X Q. 74) that it was several weeks after he got the camera before he had the necessary attachment placed on same for recording sound on the same film with the picture. We must, therefore, agree with the Examiner of Interferences that DeForest has failed to establish conception of the invention in issue prior to the constructive reduction to practice of the senior party.

Even if DeForest were given a conception as of January 1, 1921, the date set up in his preliminary statement, he would have to prove diligence from just prior to April 14, 1921, when Engl et al. entered the field, up to his filing date of July 16, 1921. There is no testimony which clearly establishes any work done on the invention in issue from January 1, 1921, up to April 14, 1921, and DeForest seeks to rely upon his work on the general subject of talking moving pictures. This work was the subject of the other interference No. 51,947, and the present invention relates to entirely different subject matter. His note books show that he had already obtained good results in making sound [fol. 113] records and after obtaining the moving picture camera on February 18, 1921, he could have coupled the two cameras without great difficulty and reduced the invention to practice, but on page 13 of his record (Q. 25) he admits that he had not attempted to actually use the invention of the interference prior to filing his application on July 16, 1921. This is also verified by the testimony of Garity on page 41, Q. 20, page 47, X Q. 52, and page 48, X Q. 55.

DeForest has failed to prove conception prior to his filing date and even if he had he has not established the diligence required of him.

The decision of the Examiner of Interferences is affirmed.

Wm. A. Kinnan, First Assistant Commissioner; Frank C. Skinner, Examiner-in-Chief; G. R. Ide, Examiner-in-Chief, Board of Appeals.

NOTICE OF APPEAL TO COURT OF APPEALS—February 24, 1930

And now comes Lee DeForest, by Darby & Darby, his attorneys, and gives notice to the Commissioner of Patents of his appeal to the United States Court of Customs and Patent Appeals from the decision of the Board of Appeals rendered on or about January 7, 1930, awarding priority of invention to Vogt, Massolle and Engl in the above entitled case, and assigns as his reasons for the appeal the following:

1. The Board of Appeals erred in awarding priority of invention to Vogt et al.

2. The Board of Appeals erred in failing to award priority of invention to Lee DeForest.

3. The Board of Appeals erred in holding in effect that Lee DeForest failed to prove conception prior to his filing date.

4. The Board of Appeals erred in holding in effect that DeForest had not established diligence.

[fol. 114] 5. The Board of Appeals erred in holding that DeForest was required to establish diligence.

Lee DeForest, by Darby & Darby, his Attorneys.

Dated: New York, N. Y., February 21, 1930.

Indorsed: United States Court of Customs and Patent Appeals. Filed Apr. 9, 1930. Arthur B. Shelton, Clerk.

[fol. 115] [Stamp:] United States Court of Customs & Patent Appeals. Filed Jan. 28, 1931. Arthur B. Shelton, Clerk.

IN THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Patent Appeal Docket No. 2749

Interference No. 53,103

LEE DEFOREST

v.

VOGT, MASSOLLE AND ENGL

Darby & Darby, Attorneys for Lee DeForest. Charles M. Thomas, Samuel E. Darby, Jr., Louis D. Fletcher, of Counsel.

BRIEF FOR DEFOREST

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[fol. 117] IN THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Patent Appeal Docket No. 2749

Interference No. 53103

LEE DEFOREST

v.

VOGT, MASSOLLE AND ENGL

BRIEF FOR DEFOREST

This is an appeal by Lee DeForest, the original senior party of a patent interference proceeding, from the decision of the Board of Appeals awarding priority of invention of the subject-matter in issue to three German inventors, Messrs. Vogt, Massolle and Engl.

Origin of the Counts

The counts forming the subject-matter of the interference originated in DeForest, and constitute claims 1 and 3 of his patent No. 1,489,314, granted April 8, 1924, on application filed July 16, 1921.

After the issuance of the DeForest patent, Vogt et al. copied the claims in their pending application Serial No. 547,860, filed March 29, 1922 (eight months subsequent to the DeForest filing date).

After the declaration of the interference, Vogt et al. moved to shift the burden of proof, basing their motion on an application filed by them in Germany on April 14, 1921. This motion was not opposed by DeForest (for reasons [fol. 118] hereinafter discussed) and hence was granted, whereby Vogt et al. were accorded an effective date of April 14, 1921. They have taken no testimony and are restricted to that date for conception of the invention.

Dr. DeForest took testimony and established, by contemporaneous written records and full corroboration by

disinterested witnesses, conception of the invention at least as early as January 18, 1921, three months prior to the record date to which Vogt et al. are restricted.

The Examiner of Interferences and the Board of Appeals awarded priority of invention to Vogt et al. solely because of an interpretation placed on the language of the counts forming the subject-matter of the interference, which interpretation we attack as not only unwarranted, but also as wholly opposed to the decision of the Examiner of Interferences in shifting the burden of proof and making effective to Vogt et al. the filing date of their German application. In other words, if the Interference Tribunals are correct in their interpretation of the subject-matter of claims 1 and 3 of the DeForest patent, then the earliest date available to Vogt et al. for conception of the invention in issue would be the filing date of their United States application.

The Issue

Thus, the issue is well defined, and consists of the determination of whether or not DeForest has established conception of the invention, defined by the claims in issue, prior to the filing date of the German application of Vogt et al. There is no question of diligence involved, as we view it, because only three months elapsed between DeForest's recorded conception of the invention and his filing date, of which period approximately one month was consumed in the preparation of his patent application (Rec. p. 89), and the undisputed testimony in the case is that DeForest was [fol. 119] devoting virtually his entire time, during all the time with which we are here concerned, to the main problem to which the invention here involved was incidental.

Assignment of Errors

The assignment of errors will be found at page 113 of the record, and all of the errors assigned will be relied upon.

The Subject-Matter

The subject-matter in controversy relates to the talking motion picture art, and more particularly to the "phonofilm" art, where both the picture and incidental sounds are photographically recorded on a film. In the motion

picture industry, the drama or other "action" being "filmed," is photographed with the usual motion picture camera, thus producing the roll of "negative" film. The "negative" is then developed by a standard developing process employed in the motion picture industry, and rolls of "positive" film are photographically printed therefrom in any desired numbers. These "positive" prints are then distributed to the theaters which have contracted for the showing of the picture, and are exhibited by means of the usual projection machines in the well understood way.

The *talking* motion picture industry follows the same general routine, the only difference being that instead of the play or other "action" being silent, the sounds incidental to such "action," such as spoken lines, music, etc., are photographically recorded at the same time that the "action" itself is being photographed. It is universal practice to make the sound record on a marginal edge of the standard film. Thus, after the negative film has been exposed to both the "action" and its incidental sound, it is [fol. 120] developed and "positive" prints made therefrom, in the usual manner, and distributed through the usual channels for reproduction in the various theaters equipped with both sound reproducers and motion picture projectors.

Dr. DeForest, in his early investigation of the sound-on-film talking motion picture art, found that for some classes of work it would be necessary to treat the photographically recorded sound record of the *negative* film to a developing process different from that to which the picture or "action" record was subjected. In other words, to properly bring out the photographically recorded *sound* record to its most efficient intensity, the *sound* record would have to be developed to a point *beyond* which the *picture* record could be properly developed without clouding.

For example, sound records are photographically recorded by varying the intensity of a source of light by and in accordance with sound waves. Obviously, if the light were not of proper intensity to make a good record, the film would have to be "over developed" in the developing process to make it capable of "printing" on the positive. If, however, the *sound* record was on the same film as the *picture* record, "over developing" of the negative film would, of necessity, "over develop," and hence cloud, the photographed pictures on that film. Thus, the problem was presented to devise some means which would permit

the *picture* record and the *sound* record to each be developed independently of the other so that each might be brought, by the developing process, to its most efficient stage, and at the same time permit both the *sound* record and *picture* record to be ultimately located on the same positive film for projection.

The obvious solution of the problem thus presented, which solution constitutes the invention in issue, was to photograph the picture, and simultaneously therewith [fol. 121] photographically record the sound, on *separate* negative films so that the sound film can be developed independently of the picture film. Thus, each film can be developed as much or as little as its own characteristics necessitate, wholly independently and irrespective of the other. The positive film can then be obtained by printing from both the picture and sound negatives onto the single positive.

This invention of DeForest was disclosed in his patent application (the issued patent is involved in the interference) which disclosed an additional invention with which the present interference is not involved. This explains why claims 2 and 4 of the DeForest patent are not involved in the interference, as well as why the problem of the art, to which the invention of claims 1 and 3 was directed, is not set forth in any great detail.

The Counts of the Interference

The invention is expressed in the counts as a method of procedure. Count 1 sets forth the method in two steps—

(1) Photographing simultaneously upon separate films the picture and the sound; and

(2) Photographing the sound record on an unexposed portion of the picture film.

Thus the *picture* negative is printed onto the positive, and the *sound* record is printed on an unexposed portion of the positive. It will be understood, of course, that printing from a negative film onto a positive film is a photographic process.

Count 2 (claim 3 of the DeForest patent) differs from count 1 only in the added limitation of location of the

sound record, viz., between the marginal edge and the sprocket perforations of the positive film.

[fol. 122] DeForest's Proofs

Dr. DeForest began his intensive work in talking motion pictures in 1919 (Rec. p. 21). A study of the subject, as developed to that date, indicated to him that the problem of talking motion pictures could best be solved by photographically recording the sounds to be reproduced. He conceived three methods of photographically recording sounds on a sensitive film, such as a motion picture film. He worked intensively from 1919 to July, 1921, in an effort to find which of the three methods would be most satisfactory and practical. In July, 1921, he went to Germany to continue his work there. In his experimental work he early found that one of the most difficult problems to be solved was that of getting a sufficiently clear and sharp photographic image of the sounds being recorded. The trouble lay in the light source which translated the sound currents into light fluctuations for photographic recording. The light source, which he at that time employed, gave very faint and weak records, and he realized early in his work, even before he had a sound record of sufficient clarity to be commercially useful, that if the picture and sound records were taken on the same film there would be difficulty in developing the film so that both photographic records would be developed to their proper degree. The technique of *picture* recording on a film was, of course, highly developed, and it was easy and common practice to get clear, sharp *picture* images. Hence, the realization on the part of Dr. DeForest that if the fainter *sound* records were recorded on the same film with the clear *picture* records, when the film was sufficiently developed to bring out the fainter *sound* record, the *picture* record would be over-developed. On the other hand, if the *picture* record was properly developed, then the *sound* record would be under-developed. By December 26, 1920, Dr. DeForest, having realized this problem, [fol. 123] conceived the method of solving it. He made an entry in his notebook, which he kept during this period (DeForest Exhibit 1), as follows (Rec. p. 23):

"Too faint. Had to develop this film for six minutes. To get at all heavy track, this completely fogged it. *So that a picture would have been ruined.*" *

This entry clearly shows the realization that when a negative film, containing a combined picture and sound record, was properly developed to get a "heavy track" (sufficient clear sound record for reproduction), the film would have been fogged (over-developed) and the picture ruined.

During this period, because he was unable to get a sufficiently actinic light, Dr. DeForest had tried many types of films, such as X-ray film, Superspeed film, Panchromatic film, etc. (Rec. p. 24).

On December 28, 1920, two days after the first entry, the following entry was made in his notebook (Rec. p. 24):

"Developed this last 10 minutes until wholly fogged. This would be too long for cine pictures. *Hence will probably need to make two negatives (picture and sound) and print on the same pos.*"

The entry in the notebook, under the date of January 18, 1921, reads:

"Developed eleven minutes (very cold day); (longer development is best for sound film but not for picture. *Hence will probably use two films*)."

From these entries it is quite apparent that DeForest had a clear conception of the invention here in controversy, and that he recorded not only the problem, but its solution as well, in his contemporaneous notebook.

[fol. 124] Full corroboration of DeForest's work and the notebook entries is found in the testimony of William E. Garity, who was employed by the DeForest Radio Telephone & Telegraph Company during 1920 and 1921 (Rec. p. 56). Garity had his office in the same room in which Dr. DeForest was doing his experimental work, and assisted Dr. DeForest in this work. He was familiar with the work which Dr. DeForest was doing, and was conversant with the notebook records (DeForest Exhibits 1 and 2) at the time, Garity stated that he saw the entries quoted above on or about the dates under which they

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* Italics in this brief are ours unless otherwise stated.

were recorded (Rec. p. 61). He testified that Dr. DeForest discussed with him he problem which arose in making the two records on the same film, during the holidays in 1920 (Rec. p. 60).

Adolph G. Senner also discussed this problem with Dr. DeForest (Rec. p. 80), and suggested a solution which Dr. DeForest rejected. The testimony of Senner, who worked for the film supply house of Herbert & Huesgen, demonstrates Dr. DeForest's activity in this work during this period. Herbert & Huesgen sold Dr. DeForest films and supplies, and developed the films which he was continuously bringing to them. Senner testified that Dr. DeForest disclosed to him the idea of using a separate picture film and a separate sound film in order that the difficulty in developing two records on the same film could be overcome (Rec. p. 80).

Dr. DeForest also testified (Rec. p. 25) that, as evidenced by his notebook (DeForest Exhibit 1), there were countless instances where he was having trouble in obtaining satisfactory photographic records of sound without overheavy—over-long-development of the negative, and consequent fogging thereof. As the first entry states, this fogging of the film would have ruined a picture record if there had been one on it. Dr. DeForest tried many de-[fol. 125] velopers and even had others develop his films to be sure that they were receiving proper treatment. An entry under date of April 6, 1921, in his notebook (DeForest Exhibit 1) reads:

"April 6th, second half of film developed by Dr. Mees at Eastman's. In appearance it is clearer (and cleaner!) than my half. These records reproduced quite noticeably better than those I developed. #3 is the best of the lot. Mees developed this record until it was quite fogged—too much for a picture film."

Thus, it is clear that even with expert developing the same problem was present, and hence, Dr. DeForest had clear proof of the necessity of overcoming the problem in some way. He clearly conceived the complete method for overcoming this problem on December 28, 1920, as the corroborated entry in his notebook proves. Dr. DeForest testified that he discussed the problem and its solution with Garity and Senner (Rec. p. 27). The testimony of these corrobo-

rating witnesses, uncontradicted in any respect, clearly and beyond a doubt establishes the conception of the invention at least by January 1, 1921.

Dr. DeForest did not reduce his invention to practice before the filing of his patent application on July 16, 1921. He was, however, devoting the major portion of his time, from December, 1920, until July, 1921, to the talking picture problem (Rec. p. 28). Indeed, Dr. DeForest worked Sundays and holidays on this problem (Rec. pp. 30, 62). Senner's testimony also shows, by the frequency with which Dr. DeForest brought supplies from, and had films developed by, Herbert & Huesgen, that he was very active in this work during this period.

Torma, another employee of Herbert & Huesgen, also testified that Dr. DeForest frequently brought in films, for development, having faint lines thereon when developed, [fol. 126] which he understood were photograhic sound records. This work was done for Dr. DeForest quite frequently up to about the middle of 1921 (Rec. p. 46). After development these films showed faint lines which sometimes vanished (Rec. p. 48).

On the Question of Reduction to Practice

DeForest did not reduce his invention to practice, prior to the filing of his patent application, for very obvious reasons.

(1) In the first place, the invention was not one which required reduction to practice to establish its practical utility. His entire line of research was directed, by Dr. DeForest, to produce *talking motion pictures.* The very name implies simultaneity of, and syncronism between, the "action" and its incidental sounds. *Motion picture* cameras were highly developed articles of commerce, in common use throughout the world. The *sound recorder,* and the various adjuncts thereof, were the things that Dr. DeForest was working on daily. The *simultaneous recording of sound and picture on the same film* might have required reduction to practice. Such a problem might present (and in fact did present) many problems of electro-mechanical nature which required numerous inventions by DeForest and other experimenters in

the art.* The use of *separate* films, one for the "action" and one for its incidental sound, is complete, insofar as its operability is concerned, on the mere statement of the [fol. 127] thought. DeForest's witness Garity pointed out (Rec. pp. 65-66) that there was no use in reducing the invention to practice at that stage of the experimental research, because the expense involved would be unnecessary in view of the fact that "it was concededly so simple." Indeed, as above stated, *the mere statement of the use of separate films for the sound and picture*, is all that was required to those skilled in the art to enable successful operation.

(2) A second, quite obvious reason why the invention was not reduced to practice, and required no reduction to practice, beyond the mere statement thereof, is that DeForest, in his intensive research of the entire problem of producing a commercially useful talking motion picture system, had not reached the "developing" stage in the system. It will be understood that when DeForest began his work to produce his "phonofilm" system he had nothing in the prior art to serve as a guide for his line of research, other than the scientifically established fact (established by the German scientist Ruhmer in 1904) that sound waves could be photographically recorded and reproduced. In other words, *he was creating a new art.* This necessitated a careful study of every step of the process, and of every mechanism used therein. He started at the beginning, and first developed a light source of sufficient actinic value and efficiency to be

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*DeForest Patent No. 1,446,246 granted February 20, 1923.

Ries Patent No. 1,473,976 granted November 13, 1923.

DeForest Patent No. 1,482,119 granted January 29, 1924.

Ries Patent No. 1,607,480 granted November 16, 1926.

DeForest Patent No. 1,653,155 granted December 20, 1927.

DeForest Patent No. 1,693,071 granted November 27, 1928.

DeForest Patent No. 1,695,414 granted December 18, 1928.

DeForest Patent No. 1,695,415 granted December 18, 1928.

DeForest Patent No. 1,716,033 granted June 4, 1929.

able to photographically record sound waves of such character as to be susceptible of faithful reproduction in the projection and reproducing machines in the theaters. At the time the invention here in controversy was made, his research had not progressed beyond the investigation and determination of the best light source for recording. He did not even own a motion picture camera (Rec. p. 31). It obviously would have been, as Garity characterized it (Rec. pp. 65-66), "an unnecessary expense," at a time when he was subjected to continual and continuously increasing expense, [fol. 128] to buy a camera solely for the purpose of reducing to practice an invention of such character that the mere statement thereof establishes its utility and operability.

It is submitted, therefore, that the invention was one of the very few classes of invention which did not require a reduction to practice to establish its operability or utility. In the final analysis, that is all that a "reduction to practice" is for, in any event.

On the Question of Diligence

Likewise, it is submitted, there is no question of diligence involved in this case. All during the time with which we are here concerned, from December, 1920, until July, 1921, DeForest devoted the major portion of his time, including nights, Sundays and holidays, to intensive experimentation on his phonofilm" system. It is true, that after recording the problem and its solution, he did not devote any part of that time, for the reasons stated, to reducing the *present* invention to practice. That was not necessary. The problem had been encountered and noted, as well as its solution. Thus, another obstacle was out of the way, and when that stage of the system was reached in the research, progress would not then be stopped because of the obstacle, for its solution had been recorded. It will be remembered that Dr. DeForest did not have as his objective the mere solution of the particular problem which the invention here in controversy solved. His ultimate objective was to produce *a commercially useful sound-on-film talking motion picture system.* No one in the history of the world had ever produced such a thing. Unless and until such a system was produced, the invention here involved would have no utility of any kind or nature whatsoever. The invention here involved was

made purely *incidental* to the solution of the major problem, [fol. 129] which alone made the present invention valuable, and without which the present invention would be useless. Therefore, the undisputed diligence of DeForest on the *major* problem cannot but be credited as diligence on the part of DeForest in the present case.

There is no hard and fast rule established by this or any other Court on the question of diligence. Whether or not the inventor has been diligent, subsequent to his conception of an invention, is determined by the circumstances of the particular case.

As stated in Robinson on Patents, Vol. I, p. 548, Section 387:

"No general standard, by which diligence can be estimated, has been established by the law, nor, in the nature of things, is such a standard possible. It must be reasonable, under all the circumstances of the particular case in question. The character of the invention; the health, the means, the liberty of the inventor; *his occupation upon kindred or subordinate inventions*—are proper subjects for consideration. Such reasonable diligence does not involve uninterrupted effort, *nor the concentration of his entire energies upon the single enterprise.*"

Again, in McTammany v. Needham, 18 O. G. 1050, Commissioner Marvel (at p. 1051) said:

"Diligence in perfecting an invention is a relative matter and the law does not require that an inventor who is engaged in developing a number of improvements at the same time should devote all his time and energy to any one at the expense of the others."

See also Stapleton v. Kinney, 96 O. G. 1432.

Commissioner Leggett, in Chapman v. Candee, C. D. 1872, 190, 2 O. G. 245, stated:

[fol. 130] "Though the invention, in a narrow sense, was complete upon the completion of the dies, yet the dies were totally valueless until machinery could be constructed of the proper strength and form to use them. Whether such machinery to work dies of large size was practicable was not certain. Upon the determination of this point depended the question of whether the dies were worth patenting; hence

the time spent in constructing the machinery was used in such experimental tests as were wise and proper before applying for a patent (for the dies)."

So, in the present case, the invention forming the subject-matter of the present controversy would be of no utility whatever without a successful sound-on-film talking motion picture system. It logically follows, therefore, that DeForest's work on the completion of the system as a whole must inevitably be considered as diligence on his part in connection with the invention here in controversy, which was merely one of the many problems with which Dr. DeForest was confronted, and which he solved in connection with his research of the entire subject.

To this effect is the opinion of the Court of Appeals for the District of Columbia in Stapleton v. Kinney, supra, wherein Judge Sheppard, after quoting with approval from Commissioner Leggett's opinion, went on to say:

"It has also been held that under certain conditions some indulgence might be extended to an inventor who delayed a particular feature of a complicated machine while diligently engaged in developing another part of the same machine calculated to materially increase its usefulness and value. McCormick v. Cleal, 83 O. G. 1514; 12 App. D. C. 335, 341; Christiansen v. Ellis, 94 O. G. 2561."

The situation presented by the present case is even more impelling because it is not alone the matter of efficiency [fol. 131] which is involved, but also the more basic consideration of *utility for any purpose.*

It is submitted that the circumstances here are such that DeForest's diligence was unquestionable.

In fact, DeForest *did* purchase a camera from Herbert & Huesgen in February, 1921 (Rec. p. 36). Torma, an employee of Herbert & Huesgen, established that the motion picture camera was purchased by DeForest on February 18, 1921 (Rec. p. 49; see also Stipulation, Rec. p. 55).

Senner, employed by Herbert & Huesgen in 1920 and 1921 (Rec. p. 77), was the one who handled the transaction of selling the camera to Dr. DeForest, as well as film and other equipment (Rec. pp. 77 and 78). He testified (Rec. p. 79), that after the purchase of the camera, Dr.

DeForest brought in films, having both pictures and sound records thereon, for development. Under vigorous cross examination this testimony was not shaken. Senner was not clear as to the exact date when these films, having both sound and picture records thereon, were brought in for development. He was positive, however, that it was a short time after the purchase of the camera in February, 1921, and certainly before April 14, 1921.

Thus it is established, by a disinterested witness, that DeForest had reduced the invention to practice very shortly after he acquired the camera, although it was impossible to definitely fix the time. It was certainly, however, before the effective date of Vogt et al. In any event, and notwithstanding the enormous expense to which DeForest was subjected in his research, he disclosed the invention to his patent attorney at least as early as June 30, 1921, for the purpose of filing his patent application, which matured into the patent involved in this interference (Stipulation, Rec. p. 89).

The DeForest notebooks (Exhibits 1 and 2) are eloquent proofs of DeForest's continued activity between the date of his conception and his filing date.

[fol. 132] Summary

It is submitted, therefore, that DeForest has conclusively established conception of the invention at least as early as January 18, 1921, which date is earlier than the record date of Vogt et al., to which they are restricted (April 14, 1921). Therefore, DeForest was the first to conceive the invention. The nature of the invention made actual reduction to practice unnecessary, and the short period of time which elapsed between the recorded, corroborated conception, and the commencement of the preparation of the patent application, all establish, we submit, that priority of invention should have been awarded to DeForest, and that the action of the Patent Office Tribunals, awarding priority to the German inventors, was a most obvious error that should be corrected by this Court.

The Fundamental Error of the Patent Office Tribunals

The question inevitably arises—why did the Patent Office Tribunals fail to award priority of invention to DeForest?

The answer is that they committed a fundamental error in the interpretation of the counts involved in the interference.

While not questioning either the authenticity of DeForest's notebook records, the corroboration thereof, or any of the facts testified to by DeForest and his corroborating witnesses, the Patent Office Tribunals pointed out that both counts recite that the picture and sound must be *simultaneously* photographed on separate films. They thereafter note the fact that nowhere in the three DeForest notebook entries is the statement made that DeForest contemplated recording the picture and its incidental sound [fol. 133] *simultaneously*. Hence, they held, DeForest had not discharged the burden of proof which he carried.

In support of their viewpoint, the Patent Office Tribunals cite the Greensfelder patent No. 1,254,684 (Rec. p. 90).

There are three separate and complete answers to the position assumed by the Patent Office Tribunals, either of which, and certainly all of them, establish the fundamental error of their ruling.

(1) In the first place, the Patent Office Tribunals completely close their eyes and their minds to the fundamental fact that all of DeForest's work was directed to the problem of producing *talking motion pictures*. It is impossible to conceive the recording of an "action" and its *incidental sounds* unless they are recorded *simultaneously*. To use an extreme illustration, how absurd it would be to depict in a theater the moving pictures of a man, whose actions and lips portray a proposal of marriage, while the sounds emanating from the sound reproducer are those incident to a prize fight. The very name "talking-motion-pictures" is opposed to the position of the Patent Office Tribunals. Its name implies pictures *and* their incidental sound.

The fact that the DeForest patent states on its face (in the claims forming the counts of the interference) that the invention is directed to *talking-motion pictures*, refutes the absurd viewpoint of the Patent Office. The fact that DeForest's entire testimony, as well as his entire work, was directed to producing *talking-motion-pictures*, likewise refutes the absurd viewpoint of the Patent Office.

The Greensfelder patent No. 1,254,684, reference to which is made in the opinion of the Patent Office Tribunals, does

not disclose what the Patent Office tribunals assumed is disclosed thereby. Greensfelder does not disclose, in any sense, the photographic recording of sounds of any par- [fol. 134] ticular action, but merely the *marking* on a film of *control* records. For example, if a picture depicts the firing of a gun, a mark is made on the film which would effect the operation of a device simulating the firing of a gun. The Greensfelder patent does not contemplate *combined sound and picture* with *all* of the sounds incident to the picture including voice, music, etc. Thus, the Patent Office tribunals have based their opinion on a mere unwarranted assumption which, in turn, is based on a fundamentally erroneous premise. There is no *photographing of sound waves* in the Greensfelder patent, as asserted by the Patent Office tribunals, and which would be necessary in order to make their contention with respect thereto even plausible. Greensfelder does not even contemplate photographically recording sound. He artificially produces what he refers to as "sound marks" which are utilized to control sound producing devices of an orchestra, for example, as distinguished from *reproduction* of the music *originally* rendered by the orchestra.

It is submitted, therefore, that there is no justification in theory or fact, for the position taken by the Patent Office Tribunals, and that they committed a most obvious error, and should be reversed.

(2) In the next place, even though the DeForest notebook entries did not, in and of themselves, use the word "simultaneously," the testimony of DeForest, and that of his corroborating witnesses, explain the entries of the notebook, and bring out the most obvious fact (were it necessary to be brought out), that *simultaneity of photographic recording of the picture and its incidental sound* was the only thing that DeForest had ever contemplated or worked on. Obviously, when DeForest's original conception was the recording of sound and picture *on the one film*, it would be impossible to record them in any way other than simultaneously. There certainly was no logical [fol. 135] justification for the Patent Office Tribunals completely ignoring the undisputed testimony of Dr. DeForest and Garity to this effect.

(3) Finally, the DeForest notebook entries here relied upon are substantially the same, in character of expres-

sion, as that portion of the German application of Vogt et al. on which they rely to establish a record date prior to Deforest's filing date.

In the German application appears the following (Rec. p. 104):

"Now, according to the invention this difficulty is obviated by that for the production of the negatives either entirely distinct films are used, or else films which, while still united during the recording work, are severed prior to development. Synchronism in either case is insured by the perforations or else by corresponding datum marks."

If the foregoing statement, appearing in the German application of Vogt et al. constitutes disclosure of the invention here in controversy, it certainly does not do so to any greater extent than do the entries in the DeForest notebooks. No mention of the word "simultaneously" appears in the disclosure.

We do not dispute, and never have disputed (and this is the reason why the motion to shift the burden of proof was not opposed), that to the reasonable mind the disclosure in the German application would mean that the picture and its *incidental sound* can be recorded on the same negative, and then, as the German specification states, "severed" thereafter, so that the sound portion and the picture portion can be separately developed. Or, in the alternative, entirely distinct films can be used. When we turn to the DeForest notebook entries and apply the same rule of reason and common sense to the language [fol. 136] therein found, the same conclusion is inevitable. The entry of December 26, 1920 (Rec. p. 23), is

"Too faint. Had to develop this film for 6 minutes to get at all heavy track, this completely fogged it. *So a picture would have been ruined.*"

What could the italicized statement refer to other than, as Dr. DeForest and Garity explain, that if a picture had been on the same film with the sound record, as was contemplated, the development of the film, to properly bring out the sound record, would have ruined the picture record? What reason in the world would have existed for DeForest having a picture record and a sound record on the same film, unless—as testified to by him, as established by the

entire record in the case, as incontrovertibly proven by the ultimate objective of his entire line of research—he was desirous of producing talking-motion-pictures—"actions" with their incidental sounds simultaneously recorded for purposes of simultaneous reproduction?

Applying the same test to the entry of December 8, 1920, which reads (Rec. p. 25):

"Developed this last 10 minutes until well fogged. This would be too long for cine picture. *Hence, will probably need to make 2 negatives (picture and sound) and print on same pos.*"

We advance as utterly absurd any interpretation of this entry other than what it plainly says, viz., for the reasons stated, that the proper development of the sound record would be too long for the picture record *simultaneously recorded on the same film.* Hence, it would be necessary to make two negatives, one for the picture and one for its sound, and print the same on a single positive.

[fol. 137] Finally, the entry of January 18, 1921 reads (Rec. p. 25):

"Developed 11 minutes (very cold day) (longer development is best for sound film but not for picture. *Hence, will probably use 2 films*)"

Here, again, simultaneity of recording the picture and its incidental sound is the only reasonable, intelligible meaning of this entry.

Thus, it will be seen that if the DeForest entries do not establish complete written records of the conception of the invention here involved, then the inevitable conclusion is that neither does the German specification of Vogt et al., and the German inventors are not entitled to the filing date of their German application. Therefore, they would be restricted to the filing date of their United States application, which, being subsequent to the filing date of DeForest's application, would result, as a matter of law, in the award of priority of invention to DeForest.

Stated another way (and we believe it is the more reasonable of the two), if the disclosure in the German application of Vogt et al. is sufficient to support the counts of this interference, then DeForest has incontrovertibly established, by contemporaneous written records, conception

of the invention at least as early as January 18, 1921 (which is earlier than any date available to Vogt et al.). Under the particular circumstances of the case, with reference to diligence, reduction to practice, etc., DeForest is the prior inventor, and the award of priority should have been made to him. The Patent Office Tribunals, because of their failure so to do, have committed error.

[fol. 138] Conclusion

The Board of Appeals of the Patent Office should be reversed, and priority of invention awarded to DeForest.

Respectfully submitted, Charles M. Thomas, Samuel E. Darby, Jr., Louis D. Fletcher, Counsel for DeForest.

Dated New York, N. Y., January 26, 1931.

[fol. 139] [Stamp:] United States Court of Customs & Patent Appeals. Filed Apr. 18, 1931. Arthur B. Shelton, Clerk.

Patent Calendar No. 241. Oct. Term, 1930

IN THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Patent Appeal Docket

No. 2,749

Interference No. 53,103

LEE DEFOREST

vs.

VOGT, MASSOLLE AND ENGL

Brief for Vogt, Massolle and Engl

Kenneth S. Neal, Attorney for Vogt, Massolle and Engl. S. Mortimer Ward, Jr., of Counsel.

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[fol. 141] IN THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

Patent Appeal Docket

No. 2,749

Interference No. 53,103

LE DEFOREST

vs.

VOGT, MASSOLLE AND ENGL

BRIEF FOR VOGT ET AL., APPELLEES

INTRODUCTION

This is an appeal by DeForest, the junior party, from the decision of the Board of Appeals of the Patent Office, affirming the decision of the Examiner of Interferences on final hearing, awarding priority of invention to Vogt et al. The concurrent decisions of the Patent Office upheld each of the three grounds advanced by the senior

parties as to why priority should be awarded to them. These grounds will be discussed later.

[fol. 142] The Invention

The invention at issue relates to a method of producing talking motion picture film. The DeForest patent is owned by the DeForest Phonofilm Corporation, and the application of Vogt et al., is owned by American Tri-Ergon Corporation, a company controlled by Mr. William Fox.

The two counts of the issue are:

1. The method of producing talking moving pictures on the same film which comprises photographing *simultaneously* upon separate films the picture and sound, and photographing the sound record on an unexposed portion of the picture film.

2. The method of producing talking moving pictures on the same film which comprises photographing *simultaneously* upon separate films the picture and the sound, and photographing the sound record on an unexposed portion of the picture film between the marginal edge and the sprocket perforations thereof.

It will be observed that the invention at issue is not one (1) merely for the recording of sound on film, nor (2) merely for the recording of pictures on film, nor both on the same film, nor (3) merely for recording sound and pictures on separate films so as to be able to develop them separately and then project them together, nor (4) merely for printing sound and pictures from separate negatives upon a single film. Each of these ideas, separately and collectively, was old prior to the conception date of either party, neither of which goes back of 1921. There are issued patents of record describing each of these four ideas, and [fol. 143] each was a well recognized part of the art prior to the date of either party to this interference. This cannot be disputed. See for example, Greensfelder, No. 1,254,684 (starting R., p. 96, line 92, and R., p. 98, lines 13 and 128). See also in addition DeForest's patent No. 1,446,246, filed in 1918, for the recording of sound.

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* Italics in this brief ours, unless otherwise indicated.

The invention at issue deals with the coordination of the *recording* of the sound and pictures upon separate film and the *coordination* of the *re-recording* of these records, as upon a single film. More specifically, the invention resides in recording the sound and pictures *simultaneously* upon separate film (negatives) and then photographing the records on these negatives upon a third film to produce a combined sound and picture film.

Motion picture film made according to the method at issue enables one to solve various problems arising in the production of such film. Among these are:

First, by recording the sound and pictures on separate films *simultaneously*, one solves the problem of difficulties arising from lack of proper timing or register of the sound with the picture in the taking thereof.

Secondly, since the light and other conditions in the recording of the sound and the pictures are different, it is advisable to adopt different means with respect to the sound and picture negatives in order to get the best results. By recording the sound and pictures on different negatives one can use different types of emulsions or sensitized surfaces on the two films and/or different developers and/or different periods of development with the same developer. This is set forth in the Vogt, et al., application, but not in the DeForest patent.

Thirdly, the method at issue enables one to take the sound record on a larger scale so as to get a better tone quality and then reproduce it in reduced dimension upon the final com- [fol. 144] bined film for the picture an sound. This is disclosed in the DeForest patent but not in the Vogt application.

Fourthly, by photographing upon a common film the sound and picture records thus taken on separate film, one gets the sound and pictures permanently in the proper timed relation or register, so that the assurance of obtaining this necessary relation is no longer dependent upon the proper operation in movie houses for the synchronizing mechanism.

[fol. 145] Preliminary Statement Dates

	Vogt et al.	DeForest
Conception and disclosure	.....	About Jan. 1, 1921 (not the invention at issue)
Reduction to practice	Limited by law to April 14, 1921, filing date foreign appln.	Jan. 15, 1921 (willfully false statement)
Effective application date	.....	July 16, 1921

Dates Sought to be Established by Record

Conception and disclosure	.....	Dec. 28, 1920 (not the invention at issue) June 30, 1921 (established by DeForest's memo. to Darby, Exh. 4)
Reduction to practice	Limited as above	Admits none even tried
Application filed	.....	July 16, 1921

[fol. 146] Brief Outline of the Case

Vogt et al are restricted by law to the filing date of their correspo-ding German application—April 14, 1921—for conception and reduction to practice so took no testimony. DeForest did not file until July 16, 1921, three months thereafter, and six and a half months after his claim conception date, during which time he admits that he neither made nor attempted any reduction to practice of the invention, and his own proofs show that during the latter part of this period, he was making talking picture films by a different method, i. e., having the sound and the pictures

photographed on the same film which were not separated but developed together, and for this reason were not satisfactory. This is significant when we come to consider DeForest's argument that one reason that he did not reduce to practice, was that he was busy working on the feature of recording sound and therefore did not get around to work on the combined records.

DeForest's proofs consist of four notebook entries by him between December 26, 1920 and April 6, 1921. He produced one witness, Garity, in an attempt to corroborate those entries. No other witness was questioned with regard to them. Our first contention is that these entries fail to disclose the invention at issue, and our second contention is that, assuming (but only for the sake of this argument) that the entries do disclose the invention, that the testimony of Garity fails to corroborate that these entries were made prior to the senior parties' date of April 14, 1921, and therefore a disclosure by these notes, whatever it may be, has not been established early enough. DeForest also testified that he had discussed his problems orally with one Senner at some date which he does not attempt to fix, and he does not state that he disclosed the invention here at issue to Senner. Senner testified that De Forest discussed [fol. 147] with him film development problems, but his testimony fails to establish a disclosure of the invention at issue. Furthermore, even if for the sake of this argument, but only for that purpose, it is assumed that Senner did receive a disclosure of the invention, his testimony fails to establish it as prior to April 14, 1921, the senior parties' date. He had no record to show the date of the conversation or conversations and the best he could say was that he was satisfied from "nothing but my memory" that the conversation was "within a week or ten days of the purchase of the camera"—meaning after the purchase of the camera —this being a camera that DeForest had purchased on February 28, 1921. This conversation between Senner and DeForest, seven years before the testimony, was a mere passing event in the course of Senner's business with another concern, and cannot establish disclosure as prior to the critical date of April 14, 1921. It is therefore a part of our first contention that DeForest's disclosure to Senner was not a disclosure of the invention at issue, and it is a part of our second contention above, that even if it could be held to be a disclosure, it has not been proven

as prior to the date of the senior parties. This constitutes DeForest's entire case.

Our third contention is that DeForest was totally lacking in diligence from the date of his alleged conception to his filing date, a period of 6½ months, during which time, if he ever had a conception of the invention, he had abandoned it in favor of a different process which he did use during the latter part of this period—some time after he purchased the camera—and that when he filed his patent application the filing of it was not an act in continuity of his alleged conception idea, i. e., with a view of solving the problem of development of sound and picture films, but that when he filed that application it was for an entirely different idea, i. e., for the idea of taking an enlarged sound record on one film and the picture record on another, and then printing the sound record in a reduced [fol. 148] size on the same film with the picture record, with the sole purpose in mind of improving the sound record by taking it enlarged and then reducing it. When he filed his application it was wholly silent on any discussion of the development of films much less of any problem in the development where the picture and sound are taken on the same film and developed together or on any solution of the problem.

It is by the merest chance that the language of the claims made in the DeForest patent happen to be so broad as to read upon the invention of the senior parties. This point is important in considering the question of diligence because DeForest is not in the position of a party who having conceived of a certain problem and its solution and after working upon it for a few months, although he never reduced it to practice, proceeded to perpeuate his idea by the filing of an application dealing with that problem and its solution. In his case, if he ever had a prior disclosure of the invention at issue he had completely turned his back on it. His own proofs show that he had the two necessary cameras to take the sound and picture records simultaneously on different films, and that all he needed to reduce the invention to practice, if he ever had any idea of it, was to have a mechanic connect the two cameras and that "a mechanic could do it in a day." But it was not attempted. He continued the old method.

Contentions of Vogt et al. with the Rulings of the Examiner of Interferences and the Board of Appeals Sustaining Each of Them

1. That assuming (but only for the purpose of this first contention) that DeForest's notebook pencil entry under date of December 28, 1920 (made at the very bottom of the page and the only entry that even remotely approximates the invention), was made as of the date alleged, and [fol. 149] is genuine; both this entry and the testimony of DeForest and his witnesses with respect to his disclosures to them of the subject matter of this entry, fall short of a disclosure of the issue. The problem and its solution set forth in this pencil entry and the testimony of the witnesses (Garity and Senner) affirming a disclosure of DeForest to them of this problem and its solution, fall short of a disclosure of the issue and relate to a radically different problem and solution thereof from that set forth in the written DeForest memorandum upon which his application was based and which Mr. Darby testifies was submitted to him by DeForest on June 30, 1921. The earliest disclosure of the invention established by DeForest is June 30, 1921—the date of said written memorandum and sketches presented to his attorney, Mr. Darby. This disclosure is a radically different one from that in the notebook or that testified to by DeForest and his witnesses, and it is based on quite a different proporsition from anything in said notebook or from anything that DeForest or his witnesses testified about. This being true, Vogt et al. must win as being the first to disclose and the first to reduce to practice.

The Examiner sustained this contention, stating—

"The invention has been patented to the party DeForest. Vogt, et al., copied the two counts from the DeForest patent but they were rejected by the primary examiner. The rejection was reversed by the Examiners-in-Chief and in their opinion they mentioned the word 'simultaneously' occurring in both claims as distinguishing these claims from the Greensfelder patent cited. Under the circumstances the *usual rule in interferences* that each limitation of the claims is to be deemed essential has particular force."

* * * * * * *

[fol. 150] "The testimony submitted by DeForest fails to prove that he had conceived this feature of simultaneously photographing the picture and the sound prior to his filing date. The notes in the DeForest notebook relied upon do not include this feature, and the corroborating witnesses do not support DeForest with respect to this feature of simultaneity" (R., p. 106).

The Board of Appeals in affirming on this point stated:

"While the simultaneous exposure of the sound and picture negatives would seem to be the most obvious procedure, the brief of Engl et al. points out that other methods were known prior to DeForest's alleged conception (see Engl et al. brief, pp. 24 and 25) and appear to be disclosed in the patent to Greensfelder, No. 1,254,684, which was cited in the application of Engl et al. and the burden was on DeForest, as the junior party, to prove his case" (R., p. 111).

2. That said entry of December 28, 1920, as the means of fixing DeForest's date of disclosure as of said date, as distinguished from a date of say April 16th, which would be after the effective application of Vogt et al.—even if the entry had been a disclosure of the invention—has not, in the light of the testimony and the circumstances of this case, been proven with that degree of certainty required, and must be viewed with grave suspicion, as will more fully appear. If the date of this notebook entry has not been established with reasonable certainty—and we submit it has not been—then there is no testimony which definitely fixes even any alleged disclosure by DeForest of the invention at issue as prior to the date of Vogt et al., and, therefore, the latter must win.

The Examiner sustained this contention, stating:

[fol. 151] "Furthermore, these corroborating witnesses had no means of fixing the date.

"Garity knows that DeForest kept a running notebook with which he was conversant in a general way, and he recognizes the two notebooks put into evidence (X Q 41, p. 63). He states, however, in answer to X Q 40, page 63, that he is not able to say that a particular record was made on a certain date, his memory not going back so far. The notes purport to have been made December, 1920, and January and April, 1921. Vogt et al., having a filing date under

the International Convention of April 14, 1921, cannot be considered as anticipated by this testimony by Garity.

"The witness Senner likewise has no way of fixing any date prior to the filing date of Vogt et al. DeForest purchased from Senner's employer on February 18, 1921, a camera, and Senner is of the impression that it was within a week or ten days after this purchase that DeForest talked with him about producing talking motion pictures. The dates here are so close, however, that the impression of the witness is not sufficiently reliable to overcome the record date of Vogt et al.

"It is also true that the testimony of neither of these witnesses includes the feature of simultaneity."

The Board of Appeals in sustaining the Examiner on this point, stated, "Furthermore, he must rely for corroboration upon his witnesses Garity and Senner." The Board then reviewed the testimony substantially as outlined above by the Examiner and concluded on this point as follows:

"DeForest says (X Q 74) that it was several weeks after he got the camera before he had the necessary attachment placed on same for recording sound on the same film with the picture. We must, therefore, agree with the Examiner [fol. 152] of Interferences that DeForest has failed to establish conception of the invention in issue prior to the constructive reduction to practice of the senior party" (R., p. 112).

3. That assuming (but only for this third contention) that DeForest has proved a disclosure of the invention as of January 1, 1921, he was utterly lacking in diligence from said date of conception to the filing of his application. (He admits that he never attempted to reduce to practice, and his assistant testified that the only thing DeForest lacked in the way of apparatus for effecting a reduction to practice—a connecting shaft—could have been supplied by a mechanic in one day, all other means for it being in his possession.) The record shows that in fact DeForest completely neglected or abandoned the idea of this invention, as one of his consultants testified he advised him to do, for other and simpler processes supposedly equally as good. DeForest, admittedly having made absolutely no effort to reduce the invention to practice, although all the facilities for so doing were available to him, but preferring to pro-

duce his motion pictures by another method, he must lose on this ground alone, independent of the others.

The Examiner sustained this contention, stating:

"DeForest being admittedly the last to reduce to practice, his reduction to practice consisting of the filing of his application, July 16, 1921, he could in any event prevail only if he established diligence between the German filing date of the other party and his own filing date. The German filing, as already stated, was April 14, 1921, so that DeForest would have the duty of proving diligence during this interval of three months.

"It is not urged upon DeForest's behalf that he was doing anything with the present invention from Vogt et al.'s record date until he submitted to his patent counsel, on [fol. 153] June 30, 1921, the data for his application. According to the testimony of his assistant Garity an actual reduction to practice would have been made without difficulty.

"It is the contention on behalf of DeForest that he was working on the problem of recording sound, and should be credited with diligence upon the basis of this activity. But this work does not amount to diligence in reducing to practice an invention involving the combination of sound and pictures. There are authorities to the effect that diligence on the whole machine may be considered as diligence toward the elements of such machine, but the present case is not of that class and DeForest can not be credited with diligence for one invention upon the basis of what he was doing toward an independent, even if related, invention. On the ground that DeForest has established no date earlier than the record date of Vogt et al. and on the further ground that he was not diligent during the three months between Vogt et al.'s filing date and his own filing date, it is ruled that Vogt et al., are the first inventors."

The Board of Appeals in affirming on this point, stated:

"Even if DeForest were given a conception as of January 1, 1921, the date set up in his preliminary statement, he would have to prove diligence from just prior to April 14, 1921, when Engl et al. entered the field, up to his filing date of July 16, 1921. There is no testimony which clearly establishes any work done on the invention in issue from January 1, 1921, up to April 14, 1921, and DeForest seeks to

rely upon his work on the general subject of talking moving pictures. This work was the subject of the other interference No. 51,947, and the present invention relates to entirely [fol. 154] different subject matter. His note books show that he had already obtained good results in making sound records and after obtaining the moving picture camera on February 18, 1921, he could have coupled the two cameras without great difficulty and reduced the invention to practice, but on page 13 of his record (Q. 25) he admits that he had not attempted to actually use the invention of the interference prior to filing his application on July 16, 1921. This is also verified by the testimony of Garity on page 41, Q. 20, page 47, X Q. 52, and page 48, X Q. 55.

"DeForest has failed to prove conception prior to his filing date and even if he had he has not established the diligence required of him" (R., pp. 112-13).

It is well settled that the concurrent decisions of the Patent Office will not be disturbed by this Court unless manifestly erroneous. Jardine vs. Hartog, 36 F. R. (2nd), page 606; Beidler vs. Caps et al., 36 F. R. (2nd), page 122.

Discussion of the Disclosures in the Specifications of the Two Parties

It will assist in a more ready understanding of the situation here presented if we first consider the differences in the disclosures of the two specifications, i. e., the differences in the problems which the parties state it is the object of their invention to overcome.

Vogt et al. point out in their specification that it is of great advantage in the production of talking movie film to have the sound and pictures recorded on the same film (this for assuring proper register in the theatres after the film is produced), but they point out that the lighting conditions in the recording of pictures are different from those in the recording of sound, resulting in relative under or over [fol. 155] exposure of one with respect to the other or of parts of the picture record with respect to the sound record (for example, part of the picture may be over-exposed with respect to the other parts, or the entire picture may be over-exposed due to brighter light with respect to the sound record, or due to a less actinic light used in recording sound or vice versa). They point out that this difficulty cannot be

taken care of in developing the negative where both sound and picture records have to be subjected to the same development treatment, as where they are taken on the same film with no opportunity to develop one separate from the other. They point out that the difficulty can be overcome by taking the sound and picture records simultaneously on separate films (as by having them connected during the photographing) and then separating them and developing them separately, giving each one the proper treatment it requires to obtain in each case a negative of the desired quality, and thereafter re-recording the sound and pictures from these two negatives thus developed, onto a third or positive film. Their disclosure as to the simultaneous making or production of the two negatives, the picture and sound negatives, i. e., the simultaneous recording of the sound and pictures, is plainly set forth in their United States application as filed, as follows:

"According to the present invention the difficulty is overcome by either employing *entirely separate films* for the *production of the negatives* or films which are *connected during the photographing,* but which are separated from one another before the developing.

"*The synchronism is assured in both cases* by the perforations and by corresponding marks" (R., p. 4).

Identically the same disclosure is also found in their German application of April 14, 1921, upon which they rely for their effective date, i. e.,

[fol. 156] "Now, according to the invention this difficulty is obviated by that for the *production of the negatives* either *entirely distinct films* are used, or else films which, *while still united during the recording work,* are severed prior to development. *Synchronism in either case is insured* by the perforations or else by corresponding datum marks" (R., p. 104).

They thus clearly disclose in both applications the idea of *simultaneously* recording the sound and pictures on separate negatives and the importance of the separate development of these negatives for the purpose of overcoming the different degrees of exposure to be encountered, and then the re-recording of these negatives on the positive film.

Contrasted with this disclosure we find in the DeForest patent a disclosure as follows: After a large number of nebulous paragraphs as to the objects of his invention, which say nothing specific, he then states commencing page 1, line 57, that he finds that if the record of the sound is made relatively large so that the maximum amplitude of the photograph track is say a half inch or more, "a more exact and faithful photograph containing any details of the finest light variations produced by sound waves will be obtained." He then goes on to state, however, that while the large record is good for merely producing sound, it is obvious that a record of this size cannot be used in connection with motion picture film unless separate films are used involving the problems of synchronism for reproduction, which he says have always been and still are considered to be objectionable problems in this art. He then states:

"In accordance with my invention, however, I produced the large, accurate and definite sound record on a film, for example, as shown in Fig. 1, and therewith reduce photo- [fol. 157] graphically the record thus obtained and print the same on one or both marginal edges of the motion picture film as shown in Fig. 2."

Further, on page 2, commencing at line 11, he points out that by means of this arrangement it will be apparent that the large distinct sound record may be accurately reproduced in smaller dimensions but in complete detail on the motion picture film.

The patent is wholly silent as to any reference to difficulties with respect to the relative exposures of sound and picture, and as to any suggestion of obtaining any advantages by separate development treatments to overcome any such trouble. It is important to bear this in mind when we come to consider the subject matter of DeForest's first alleged disclosure, which consists entirely of a statement with respect to development troubles accompanied by the suggestion of overcoming the same by printing on separate negatives. This was a part of the idea set forth in the Vogt et al. application and in their corresponding foreign patents, some of which, for example, the German and French patents, having issued as early as February, 1923 (German patent No. 368,383 and French patent No. 549,728), long prior to the date of DeForest's preliminary statement which was executed in December, 1925.

It will also be interesting in this connection to bear in mind that the DeForest description—DeForest Exhibit 4—which he furnished to his patent attorney on June 30, 1921, for the purpose of preparing his patent in interference, is likewise wholly silent on any suggestion as to relative degrees of exposure of picture and sound records and as to separate developing of the same to overcome this trouble.

In view of the radical difference in the disclosures of the specifications of the two parties, it will also perhaps be advisable to briefly review the way in which this interference came about.

[fol. 158] Vogt et al., upon observing the claims granted to DeForest in his patent, considered that the claims 1 and 2 of the DeForest patent were so broad in their terms that DeForest might contend that they were readable upon the method described in the Vogt et al. application, and that a court might so hold. Although Vogt et al. realized the difference in the two disclosures they felt that for this reason an interference should be declared to avoid future irreparable injury.

On the other hand, it was argued before the Primary Examiner that if the interference was declared DeForest was at liberty to bring a motion to dissolve on the ground that his claims should be so interpreted as not to read on the disclosure of Vogt et al., and that if he brought such a motion then he would forever thereafter be estopped from contending for a broader interpretation of his claims such as to cover the method of Vogt et al., in which case the latter would be protected. Vogt et al. did not contend that the DeForest claims must be interpreted so as to read upon their method. They contended that they were susceptible to this interpretation, and that they should be given the benefit of the doubt by having the interference declared.

The Primary Examiner refused to allow the two DeForest claims to Vogt et al., but on appeal the Board did allow them, holding that they could and should be interpreted so as to read on the disclosure of Vogt et al.

DeForest has not made a motion to dissolve on the ground that the claims should not be construed so as to be read upon the disclosure of Vogt et al. Therefore, by his silence under these circumstances, he contends that they must be given such an interpretation as to read upon the disclosures of both of the parties; and in his brief before the Examiner of Interferences he made this assertion.

One of the suspicious features of DeForest's case is that while his sketch to Mr. Darby of June 30th and his entire patent specification deal only with the problems of using [fol. 159] separate films for sound and picture for the purpose of taking an enlarged sound record and then reducing the latter as printed on the picture film, and indeed deal with the taking of the enlarged sound record and reducing it in one dimension regardless of whether or not it is in conjunction with a picture, and while neither this memorandum of DeForest's nor the specification make any reference to problems in development being a feature that DeForest sought to overcome by his invention; yet DeForest proceeds to present proofs in the way of pencil entries in his famous notebooks setting forth just these problems with respect to development of film, and seeks to predicate a disclosure on these as of a date earlier than Vogt et al., and notwithstanding the fact that his application was really predicated, as stated, on an entirely different idea.

DeForest's Contention that Senior Parties' German Application Does Not Disclose Simultaneity in Recording Sound and Pictures

This is an eleventh hour contention of DeForest's after he was defeated before the Examiner of Interferences and it is wholly without merit. He raised this point first before the Board, contending that if the claims at issue are to be limited to simultaneous recording of the sound and picture, then the senior parties are not entitled to their German filing date because that application did not disclose this feature.

In the first place, the German application—see the pertinent quotation above—does fully disclose this idea, and secondly, the disclosure so far as concerns this point, is precisely that of their United States application, and DeForest is estopped at this time from raising any question about it. Taking up the last point first, as the record shows, Vogt et al., within the thirty days allowed under the rules for bringing motions, duly filed their motion to shift the bur- [fol. 160] den of proof based on their German application, a copy of which was filed in the Patent Office. This motion was not opposed and the burden was shifted. DeForest having failed to oppose that motion, is now estopped from contending that that application does not disclose the lan-

guage of the issues. Furthermore, as will be seen from a mere reading of the above pertinent quotations from the United States application and the German application, the two cannot be distinguished on this point and therefore DeForest's contention is tantamount to a contention that the senior parties' U. S. application does not disclose the invention, but he is estopped at this late date from making that contention (Rule 130), since the same should have been made within the thirty-day motion period under Rule 122 of the Patent Office.

As to the merits of the contention, it will be seen from the above quotation from the German application, that it is stated that in the making of the negatives of the two records, either entirely separate films may be used or films which are united during the recording. Obviously, if the negative films are united during the recording, the sound and picture records must of necessity have been taken thereon simultaneously because there would be no opportunity for making a talking motion picture by the only other method known, i. e., "scoring" the sound to the picture. To do that one must first take the picture negative, develop and project it, and then make the negative of the sound record, "scoring" it to the picture during the projection of the picture, so as to get a negative of the sound, which can then be developed and the picture and the sound records then printed on one positive. Furthermore, the statement in the German case is that whether the films are entirely separate or united during the taking of the negative, "*synchronism* in both cases is insured" by perforations, etc. It is impossible to have synchronism in the taking ex- [fol. 161] cept by simultaneous taking. The word "synchronism" here requires simultaneous taking and nothing short of it. Webster's Dictionary defines "synchronism" as follows: "(1) The concurrence of events in time; *simultaneousness.*" The Board as to this contention, held:

"In our opinion the statements that the films are still united during the recording indicates that the record is made simultaneously on both films and this is further borne out by the statement that, when separated for development purposes, the *synchronization* is insured by perforations and suitable marks so that they can be reconnected with proper registration. The same disclosure is found in the U. S. application of Engl et al." (R., p. 111).

First Contention

Notebook entries and testimony with respect to the subject matter thereof, do not disclose the invention at issue.

It will be noted from the counts of the issue that each is expressly limited to "photographing *simultaneously* upon separate films the picture and the sound."

DeForest's testimony and his notebook show that the entries he relies upon refer to film that he had taken, having sound record only.

Referring to DeForest's testimony, page 5, the first entry referred to by him is under date of December 26, 1920, as follows:

"Too faint. Had to develop this film for 6 minutes to get at all heavy track, this completely fogged it. So a picture would have been ruined."

Obviously, this falls very far short of the disclosure of the invention as it fails to contain the above-quoted limitations [fol. 162] of the count. The only thing it discloses is DeForest's conclusion that if a picture had been on this film it would have been ruined. It suggests no remedy for the difficulty, much less does it disclose the idea of recording simultaneously on separate films, etc.

The only other entries referred to by him in his notebook are (R., p. 25) the first under date of December 28, 1920, which is as follows:

"Developed this last 10 minutes until well fogged. This would be too long for cine picture. Hence, will probably need to make 2 negatives (picture and sound) and print on same pos."

This discloses that the development was too long for a picture and that he would "probably" need to make two negatives and print on the same positive, but it wholly fails to disclose the first requirement of the issues, i. e., "photographing *simultaneously* upon separate films the picture and the sound."

This entry is the nearest approach to the issue of the three entries. The next one, under date of January 18th, is as follows:

"Developed 11 minutes (very cold day) (longer development is best for sound film but not for picture. Hence, will probably use 2 films)."

This entry goes no further than to point out that a long development is not good for a picture record and that he would "probably" use two films. It lacks the limitation of the simultaneous taking of the sound and picture records, and also the second limitation reprinting on the same positive. The fourth and last entry cited, Record, page 25, under date of April 6, 1921, is no better than the first.

The first, third and fourth entries may be dismissed from consideration due to their meagreness; so we will [fol. 163] only consider the second entry which is pointed out lacks the idea of *simultaneous* taking of the sound and picture negatives on separate films. *This is a distinct limitation of the issue. A disclosure which fails to include it must fail as a disclosure of the issue.* It would seem unnecessary to discuss authorities on this point. As shown by the above quotation from the Examiner's ruling, it is "the usual ruling in interferences that each limitation of the claims is to be deemed essential." That this is so is made further obvious by considering the issues from the standpoint of infringement. Suppose DeForest had sued one for infringement of either of these claims and it was established that the sound and picture records were not taken "simultaneously" but that the pictures were first taken, printed and projected, and that the sound record was then taken by "scoring" it to the picture, and the two then printed on a common positive. Certainly, the defendant would escape on the ground of non-infringement of the very definite limitation which the patentee has placed in the claims.

This point is well taken regardless of any ruling of the Patent Office that this limitation was necessary to support the patentability of the issue over the prior art. But as a matter of fact the Board of Appeals has made such a ruling in this case. The Board in discussing the prior art in their opinion on Vogt et al.'s ex parte appeal from the Primary Examiner in rejecting their claim 1 and the claims which are the issue of this interference, and in pointing out the distinction of these claims over the prior art, stated among other things:

"The Examiner allowed these claims (meaning to DeForest) which is evidence of their patentability notwithstanding that the Greensfelder patent was prior art and which shows the printing of the two positives side by side, Fig. 5, as does also the Craig patent as above set forth. Greensfelder *does not photograph his negatives simultaneously.*"

[fol. 164] This Board thus points out that the limitation in the claims, of photographing the sound and picture records simultaneously, is in their opinion the distinguishing feature of the issue over Greensfelder. And so it is. *So far as concerns the issue, the disclosures in the notebook entries do not go beyond the prior art, and therefore, clearly they cannot be held to be a disclosure of anything which has been found patentable over the prior art. We respectfully submit that they must fail as a disclosure of either of the issues.*

The 2nd and 3rd entries are the only ones in the two DeForest notebooks that even suggest the use of separate films for sound and picture. DeForest admits this at Record, page 37:

X Q. 54. "And in that book, as far as I could ascertain, there are only two entries,—namely, those under date of December 28, 1920, and January 18, 1921,—which make any reference or suggestion to the use of two separate films for recording sound and pictures; is that correct?

A. Yes; those are the two references to the use of two films, one for recording sound and one for the picture."

See also X Q. 64, to the effect that there are no entries to this idea in the second notebook.

DeForest does not testify that he disclosed anything to Garity with regard to recording sound and pictures on separate films, beyond what is set forth in these notebook entries. Nor does Garity testify that he received any disclosure from DeForest with respect to this matter, beyond what he read in these entries.

As to DeForest's own testimony, nowhere does he testify that he had the idea of simultaneously taking the sound and picture records. Commencing near the bottom of Record, page 24, he makes his first statement as to

[fol. 165] what he had in mind with respect to combining sound and picture records on film. This statement fails to contain either of the above quoted limitations of the counts, and is merely a statement that he realized from the beginning that if the sound and pictures were taken on the same negative there would be trouble in developing. The next statement he makes as to the solution of his troubles, commences near the bottom of Record, page 26, wherein he again fails to state any conception of the idea of photographing simultaneously on the two negatives.

In this connection it should be noted that the excuse DeForest gives (R., p. 31, in answer to Q. 25) for not having reduced the invention to practice, i. e., that he did not have two cameras to synchronize nor means for synchronizing them—which excuse was shown on cross examination to be untrue—is in no sense a statement that he had the conception of the simultaneous taking of sound and pictures in 1921, much less prior to April 14, 1921. The statement he gives at that point of his testimony is not as to his conception or disclosure at any particular time, but is merely in answer to the question of whether he attempted prior to July 16, 1921, to use "the invention of this interference" which, of course, carries with it the limitation to the simultaneous taking of the two negatives, and DeForest realized this in giving his answer.

The only two witnesses who testified on behalf of DeForest with respect to a disclosure by DeForest of his difficulties with developing the film, are Garity and Senner. Nowhere does either one of them include in his testimony as to DeForest's disclosure, a statement that DeForest disclosed to them the idea of taking the sound and picture negatives *simultaneously*. Garity's first reference to the disclosure is at Record, page 58, Q. 14, and the only thing he states is that it was realized that the "developing of the voice record would have to be separate from the developing of the picture."

[fol. 166] He next refers to DeForest's disclosure to him in answer to Q. 20, Record, page 59, wherein he states that DeForest told him that,

"at some time soon or later, when the opportunity presented itself, he would develop the necessary mechanical apparatus to develop first the picture and then the voice

and then superimpose the two on a single negative, from which we would make the positives. The actual mechanical work wasn't done at that time, because there was no necessity for it."

This statement is entirely void of any reference to taking the sound and picture record simultaneously. At page 61, under grossly leading questions, he says that he saw these entries in the notebook at about the dates thereof, but this goes no further than the entries themselves and hence fails, and he retracted this testimony on cross-examination.

The only reference by any of DeForest's witnesses with regard to taking two negatives simultaneously, is the statement made by Garity in his attempt to excuse DeForest's failure for not reducing the invention to practice. This is found at Record, page 65, X Q. 52, wherein he stated that it was understood that a sound camera and a motion picture camera could be connected together by some drive shaft to synchronize one with the other. While this statement embodies an appreciation by him *now* of the taking of the two films simultaneously, yet this is clearly not testimony that DeForest disclosed this idea to him, much less at any time prior to Vogt, et al.'s, date of April 14, 1921, nor for that matter, at any particular time during the period covered by DeForest's notebooks which ran from November, 1919, until January 26, 1922. The question which he answered shows that this knowledge by him was not as of any particular time during the running of the [fol. 167] notebooks. Garity probably got his idea of the simultaneous taking, from the issue itself.

The witness Senner does not mention the notebooks. With regard to Senner's deposition, he points out at Record, page 79, that DeForest brought a film to his place showing picture and sound records thereon, and that he pointed out to DeForest that the picture was much underexposed. This shows that the sound and the picture were not taken on separate films and separately developed and reprinted on one film, but that they had been developed on the same film and possessed the old difficulties. At Record, page 80, Q. 26, he says that DeForest had many ideas, "amongst others he had the idea of using a separate film for the picture and for the sound," which *Senner says he immediately discouraged.* Obviously this testimony falls far short of establishing a disclosure of the issue and dis-

closes nothing over the prior state of the art. All that DeForest has to say as to his alleged disclosure to Senner is found on Record, page 27,—"I discussed these problems and the development of my films with Mr. Senner," etc.

This is the entire evidence offered by DeForest in support of any disclosure of the issue prior to June 30, 1921, when he sent his description and sketch to Mr. Darby based on the idea of taking *enlarged sound* records separate from the picture record, and finally recording both on a single film.

In that conception sketch, Exhibit 4 above mentioned, Deforest by that time had conceived of the idea of photographing *simultaneously* the sound and the pictures, for the first statement on that paper is "*Claim basically* the method photographing *simultaneously* on separate films the picture and the sound, and then *reducing* the sound, * * *." It will be noted from this exhibit that DeForest had underscored the word "*simultaneously,*" thus emphasizing the importance of it as a part of his invention, which [fol. 168] at that date he had—but it was too late. If, as DeForest now contends, the simultaneous taking of the picture and the sound was so obvious and was the only way that anyone would think of in producing a talking picture film, why, when he submitted this memorandum to his patent attorney for the preparation of the application in suit, did he find it advisable to lay such emphasis on the word "simultaneously" in instructing his attorney as to the claims to draw? Why did he not simply instruct his attorney to claim basically the method of photographing on separate films the picture and the sound, etc.? It should be borne in mind that the talking picture art at this time was in its infancy, in a laboratory state, as shown by this record. Up to this time public demonstrations of talking pictures produced by the method of photographing sound in any form, had not been publicly given.

Nor can it be said in this connection, even if saying so would do any good, that photographing the picture and the sound simultaneously was the obvious way that anyone would *now* think of doing it because (1) the Patent Office held that this is the distinguishing feature over the art; (2) the fact is that others at that time had suggesed the other method—non-simultaneous taking—*and it is in extensive use today,* as for example where a picture is taken in

the open and later "scored" to music, speaking or singing, in the studio; or where one acts in a picture who cannot sing or speak well and later another sings or speaks, and the picture is "scored" to the song or speaking, etc.

The burden is on DeForest to prove his conceptions by clear and convincing testimony. We respectfully submit on this point of the case that DeForest has utterly failed to show conception of the invention at issue prior to the record date of Vogt et al., and the latter being the first to conceive and reduce to practice, must prevail.

It is thought unnecessary to quote extensively from law authorities as to the requirements for disclosure. We will [fol. 169] content ourselves with the following quotations:

Robinson on Patents (p. 532):

Sec. 376. "The conception of the invention consists in the complete performance of the mental part of the inventive act."

* * * * * * *

Sec. 378. "This idea must, in the second place, include every essential attribute of the complete and practical invention."

Sec. 380. "*Date of Conception is Date of Complete Conception.*

"The date of the conception of an invention is the date when this idea of means, including all the essential attributes of the invention, become so clearly defined in the mind of the inventor as to be capable of exterior expression. *The evidence* by which this date is determined, in case of controversy, *must be of such a nature as to demonstrate that the conception was complete.* Obviously, the mere assertion of the inventor that at a given time this idea was fully present to his mental vision, unaccompanied by contemporaneous acts or words indicating its existence, is not such evidence; for though his good faith be unquestioned, it is still doubtful whether his apprehension of the invention was definite enough to have enabled him to reduce it to practice without a further exercise of inventive skill."

See also, Mergenthaler vs. Scudder, C. D. 1897, page 724, at page 731:

"A complete conception as defined in an issue of priority of invention is matter of fact and must be *clearly estab-*

[fol. 170] *lished by proof.* The conception of the invention consists in the complete performance of the mental part of the inventive act. All that remains to be accomplished in order to perfect the act or instrument belongs to the department of construcion, not invention. It is, therefore, the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention as it is thereafter to be applied in practice that constitutes an available conception within the meaning of the patent law."

DeForest contends in his brief that the Board in awarding priority to the senior parties, based its conclusion on the point that the Greensfelder patent required the issue to be limited to simultaneous taking of the records; that the patent does not require this limitation and that therefore the lower tribunals erred in their decision. These contentions are obviously not sound. We will discuss the Greensfelder patent and its relation to our first contention infra, under the heading "Reply to DeForest's Brief."

Second Contention

Genuineness of the pencil notebook entries of December 28, 1920, and January 18, 1921, should under the facts here be viewed with grave suspicion, and have not been proved with that degree of certainty required.

This phase of the discussion is distasteful to us but we feel it our duty to take it up. In doing this we do not wish to be understood as challenging the good faith or the integrity of the witnesses Garity and Senner, who are presumably disinterested witnesses although no doubt old and staunch friends of DeForest, and it would be unfair to do this. We believe that these two witnesses testified in good [fol. 171] faith and testified to what they now recollect as being the facts disclosed to them and the dates of these disclosures, which occurred seven years prior to their testimony; although they no doubt gave DeForest the benefit of any doubts. But no human being could be expected to remember over a period of seven years, with any degree of certainty, precise oral statements to them made over such a length of time, nor could they be expected to fix within a month or two the exact date of any such statements to them, without some definite record by which to fix it. Indeed, any witness who would attempt to do this after seven years

without any record must have his sincerity and integrity severely questioned. Neither of these witnesses has attempted to positively fix the date of DeForest's alleged disclosures to him as being of any definite date, without the aid of some record.

With respect to the witness Senner, he fixes the date of such disclosures as he received from DeForest, by the date of purchase by DeForest of a motion picture camera from Senner's concern, which date he did not personally remember. Using this as a means of fixing his date, Senner testified that the disclosure was "within a week or ten days of the purchase of the camera" (Q. 29, R., p. 81). It has been proven by another that the camera was purchased on February 28, 1921, and a week or ten days would place the disclosure at the earliest, as of about March 7th. The difference between March 7th and April 14th—the date of Vogt et al.—is but five weeks. This disclosure of DeForest to Senner was a mere passing event in Senner's every day work. He was at the time manager of the motion picture department of Herbert & Huesgen, of this city. He is now a "motion picture camera man." DeForest coming in to him and discussing with him a strip of film that his concern had developed for DeForest, was a mere passing incident in his day's business. He frankly admits that aside from [fol. 172] the purchase of the camera—the date of which he does not testify to—he is testifying from "nothing but my memory" (X Q. 44, R., p. 83), and that he was not testifying to any dates except that the disclosure took place within a week or ten days after the purchase of the camera, according to his recollection.

We submit that the human mind, under these circumstances, cannot be relied upon to establish, with any degree of certainty, whether under such circumstances, the disclosure took place on say March 7, 1921, as distinguished from say April 15, 1921, which would be too late. Furthermore, according to DeForest's testimony, it must have been "several weeks" instead of a week or ten days after the purchase of the camera before DeForest could have had any films containing sound and pictures to show Senner. He testified (X Q. 74, R., p. 44):

"It was several weeks after I got the camera before I had the necessary attachment placed on the same for recording sound on the same film with the picture."

If the date of disclosure—such as it was to Senner—must rest on Senner's testimony, clearly it has not been established with any degree of reliability or certainty prior to the record date of Vogt et al.

In the case of Garity, it is clear from his testimony (considered, infra), that he relies wholly upon the pencil entries that DeForest himself made in his notebook on two dates to be discussed, as the sole means by which to fix the disclosure to him as of any date prior to April 14, 1921, as distinguished from some date subsequent thereto; and this, of course, predicates the date of his corroboration of DeForest entirely upon DeForest's integrity and the genuineness of these pencil notes.

We are, therefore, thrown back on a consideration of the genuineness of the two DeForest pencil notes of December 28th, 1920, and January 18th, 1921. This brings us to a [fol. 173] consideration of the reliability and integrity of the witness DeForest.

This record shows him to be unworthy of belief, and as one upon whose acts and testimony, reliance cannot be placed. In support of this contention we first invite attention to the preliminary statement in this case. This statement was sworn to in December, 1925, and in it he states that "the invention was first reduced to practice on or about January 15, 1921." *It appears from his testimony that this was a willful misstatement made with full knowledge of the facts in this case, including the information in his notebook.* It must have been made with the hope and expectation that he would be able in some way to establish that fact.

Referring to the record, DeForest (R., p. 31, Q. 25) was advised of the filing date of his patent in interference, and was asked:

"Had you *attempted to actually use the invention* of this interference prior to the filing date of your application? A. *No, I did not,* for the reason that I had only my motion picture camera—my one motion picture camera—" etc.

And further on "I would have had to have two cameras." Again at Record, page 36, X Q. 51, when asked if he was intending by his testimony to give the impression that three-fourths of his time during the period in question was occupied in taking picture and sound records on separate

films and then printing on a third, he testified, "Oh, no, not at all. *I did not begin to take pictures until* I purchased the camera from Herbert & Huesgen in *February, 1921.*"

Now, aside from the notebooks, we respectfully submit that if there was anything that must have stood out in DeForest's mind with regard to this entire matter, it must have been that he had not reduced this invention to prac- [fol. 174] tice—that *he had never even photographed on two separate films,* the picture and the sound. This record clearly shows that to be the fact.

Not only this, but DeForest and his attorney had these notebooks, that he testifies about, at the time that the preliminary statement was prepared. He was cross-examined about this (R., p. 34), where he testifies that they had been either in his possession or in the possession of Mr. Darby from July, 1925, until produced for his testimony.

As previously pointed out, DeForest admits that there are no other entries in his notebooks than those above discussed, making any reference to the use of separate films for sound and picture, and a careful inspection of the books shows that there are no other entries on this point. Furthermore, he testifies (R., p. 22) that

"I was very careful during this period to make note of almost every experiment which I conducted, and also the line of research which I proposed to work."

From the foregoing it will be obvious, and the notebooks themselves which were in his possession show conclusively and independent of reliance upon his recollection, that he had never attempted a reduction to practice of the invention.

There would seem to be no doubt of the fact that he is guilty of making a willful and deliberate false oath.

Furthermore, there has been no effort on his part to corroborate the statement in his preliminary statement that the invention has been used commercially. It would appear from Garity's testimony that the invention has not been so used. Garity testifies commencing at X Q. 65, Record, page 67, that the invention was never utilized the entire time he was with DeForest, and that he was there up to 1924.

[fol. 175] A man who will thus make such a false oath should not be entitled to any presumptions of good faith or honest dealing, and his acts and testimony must be viewed with grave suspicion.

It may well be that DeForest, like all others, knew that an over-development of a film would fog a picture, and it may be that at some time during this period of from January to July, 1921, he had the general idea of utilizing two films, but we do not believe he ever entered any such statements in his notebook during that period, much less at the dates of these entries of December 28, 1920, and January 18, 1921. There are certain significant things to be considered with respect to them. *Both entries are in pencil immediately at the bottom of their two respective pages.* Neither the previous first entry nor the fourth entry have any reference to utilizing two negatives or of printing from these onto a third or positive film. He may readily have added, but at a recent date, to the second entry the words "hence, will probably need to make two negatives (picture and sound) and print on the same positive," and to the third entry, the words, "hence, will probably use two films."

It would not be at all surprising if DeForest having done this, and having shown these entries to his old friend Garity, who recalling that the sound film had to be over-developed, and relying upon the integrity of these entries of DeForest's, might well have had his mind stimulated—due to the frailty and treachery of human recollection—as to DeForest having disclosed this much to him during the course of their work in 1921; and that relying upon DeForest's integrity in making said entries, he would testify to having read those entries in the book.

Charging DeForest with the capability of doing this is not charging him with anything beyond what might be expected of him in view of the foregoing. The law presumes that a man who will thus falsify preliminary statements [fol. 176] is not entitled to have any reliance placed upon his acts or statements.

LaFlare vs. Chase, C. D., 1896, page 285, at page 290:

"We feel ourselves corstrained *wholly to discredit the story of the appellee,* Chase. His preliminary statement, which should have been made and which we must presume

was made with due care and deliberation, is undeniably false in the essential statement of the time when his alleged invention was reduced to practice. There was no justification for that statement."

* * * * * * *

"it was recklessness or worse for him to aver under oath that he had made in May the reduction to practice *which his own testimony shows conclusively could not have been made* until after July 2. If we were to apply the maximum *falsus in uno falsus in omnibus*, we might stop here and resolve the case at once against the appellee."

See also Shaffer vs. Dolan, C. D., 1904, 592. Miles vs. Todd, C. D., 1904, 420.

This brings us to that part of Garity's testimony dealing with the date of disclosure to him. We will discuss only that part dealing with date of disclosure. The first reference to it is in Q. 14, Record, page 58, where he was asked, assuming that the controversy deals in part with making separate records of sound and pictures for talking motion pictures, was that a subject that you "at any time in 1920 or 1921 were conversant with?" His answer to this mentions no dates whatsoever, so in no way fixes the [fol. 177] date of disclosure as prior to April 14, 1921. On Record, page 59, he testifies that he read every record made by DeForest in his notebooks at that time, but that again fixes no date. The answer to Q. 20, stating what DeForest told him, gives no date for the same. He was then asked:

Q. 21. "Do you recall when Dr. DeForest made this disclosure to you, and if, to your recollection, he made any record of such a solution?

A. *I can't state any definite time,* because all during that period we realized the necessity of it, and as I recall, Doctor made some notes as to method of developing mechanical technique for taking two records and producing a single film from them. * * *"

This answer clearly shows that the witness could not fix the date without reliance upon some entries in the book to be shown him. He was then asked if he could give any definite time before which he discussed the matter with DeForest,

and he answered that he would place the first time around the holidays of 1920.

Obviously this is relying entirely upon recollection and could have no probative value without something further, particularly in view of the extremely poor memory this witness is shown from the record to have with respect to other and more important and spectacular matters. At Record, page 61, Q. 28, his attention was called to the No. 2 entry in the notebook—that of December 28, 1920—and he was asked the grossly leading question—

"I • • • ask you if you can positively state that you saw that memoranda on or about the date thereof,"

to which he answered "Yes," over our objection to this leading question. The question is obviously in unaccept-[fol. 178] able form; the objection was good, and we submit the answer should not be received. He was then asked if he had any definite recollection of discussing the subject matter of it with DeForest, and he answered—

"Not this particular entry, I have no particular recollection of this definitely."

He was then asked another leading question, to wit—Q. 30, if he had any definite recollection of discussing the subject matter of the entry with DeForest on or about the date thereof. This was likewise objected to, and he answered—

"This subject matter was discussed continuously on and off throughout that period. I cannot name any particular time on which we discussed it."

This again shows the utter impossibility of this witness, from his own recollection of things, to identify the disclosure such as it was, at a date prior to April 14th, as distinguished from a date subsequent thereto, which date falls right in the middle of this period that he is testifying about. He was then shown the entry No. 3, of January 18, 1921, and was asked the same grossly leading question, as to whether he could recall having read that entry on or about the date thereof, and over objection he answered in the affirmative. We submit that for the same reason this answer must be rejected from consideration. It may be well to state at this point also that the witness did not fully comprehend the significance of these answers

of his to those leading questions, for on cross examination he clearly retracted this testimony.

The immediate point here is that any effort by Garity to fix the date definitely has depended *entirely upon the genuineness of these entries.* As these are the only two entries that refer at all to two films, we may disregard [fol. 179] the question about the fourth which is along the same lines as above.

In order to test out whether this witness really appreciated what he had been testifying to under leading questions, by which words were being put into his mouth, the first cross question to him was one based on fictitious premises (X Q. 40), in which he was asked to explain how he was able to identify the fourth entry as of the date under which it appears, and yet as we understood him, he was unable to identify the others as of the dates under which they appear. To this question he answered—

"I don't think I identified them exactly as to date. I can't do that. I can testify to the record—the running record. I was conversant with that record when made, but to say that a particular record 2 or 3 or 4 was made on a certain date, I can't testify to that. *My memory doesn't go back that far."*

X Q. 41. "In other words, what you know about this notebook is that Dr. DeForest was keeping a notebook of this character in 1921 and 1922, making entries in it, *and that you were in a general way conversant with the notebook at that time?"*

A. *"Exactly."*

We think this clearly shows that Garity relies wholly upon the genuineness of these entries to fix the date as prior to April 14th of that year.

Not only this, but the record shows that Garity has an extremely poor and unreliable memory. From the testimony in a prior interference argued before the Board with this interference and referred to by them in their opinion, counsel for appellees was aware of the fact that the DeForest Company's factory building—the company with whom Garity had been employed—had completely burned down at some time while Garity was employed there; and counsel had since the taking of that testimony learned the correct date of this fire. Counsel felt that

[fol. 180] if any event around that period should stand out in Garrity's mind it should be the date of that fire, and that if Garity could not remember the date of that outstanding event, then his recollection over a period of seven years on the question of whether he had received a disclosure from DeForest before or after April 14th, would certainly not be entitled to any weight. The correct date of this fire was January, 1921, so counsel put the question to Garity—

X Q. 73. "When was the fire at High Bridge?" A. "*The latter part of 1921,* I recall."

X Q. 74. "Do you remember in what month?" A. "I think it was in *September or November*—somewheres in the fall; we had just finished inventory; that is generally taken in the fall."

DeForest's counsel realizing this situation, endeavored to straighten Garity out. But this only tended to emphasize the unreliability of his memory. The re-direct commences on page 72. He was asked what was his recollection as to the fire occurring before DeForest went to Europe in July, 1921, or afterwards (it occurred before). This was another outstanding event. He answered, "I think it was after Doctor went—after, I would say." He was then prodded with other questions to try and refresh his recollection, but they all failed. Again on re-direct after a conference between DeForest and his attorney, they again went back at Garity to straighten him out on this, and after another series of questions which failed, he was asked (R-R. D. Q. 117):

"I am endeavoring to refresh your recollection as to the date of the fire. Do you recall a New Year's Eve party that was held at 1415 Sedgwick Avenue?"

This and other questions with regard to this famous party finally brought from Garity by a series of deductions, the [fol. 181] correct statement that the fire occurred in January, 1921.

We respectfully submit that Garity's recollection as to DeForest's laboratory work that happened seven years prior—although his intentions were no doubt honest—is shown to be wholly unreliable and cannot be accepted as establishing the date of disclosure as of the date of these

notebook entries. We think that all that Garity's testimony can be accepted as establishing is that he knew that Deforest was keeping notebooks and making entries therein, and that DeForest, at some time during this period, had discussed with Garity difficulties in developing the sound records. Everything else could honestly come—with the frailty of human memory—from his recollection being stimulated by his accepting the genuineness of these entries shown him by his old friend DeForest. At all events it is clear that Garity relies wholly upon the genuineness of these entries.

The burden is upon DeForest to establish the date of his disclosure—such as it was—with reasonable certainty. We have shown that DeForest's conduct and action in this case should be viewed with the gravest suspicion and that these notes in and of themselves are suspicious in view of the foregoing circumstances. His opponents being foreigners, he knew they were limited to their foreign application dates, and these patents having been issued, *he knew before this interference was declared, what dates his opponents were limited to.*

We submit that the entries should not be accepted as genuine and that the disclosures by DeForest to these witnesses, such as it was—not that of the issue—has not been established with that degree of certainty required, as of a date prior to April 14, 1921.

The Examiner of Interferences has correctly so ruled. He held:

"Furthermore, these corroborating witnesses had no means of fixing the date." * * * "The dates here are [fol. 182] so close, however, that the impressions of the witness are not sufficiently reliable to overcome the record date of Vogt et al."

To the same effect is the holding of the Board at Record, page 112.

Third Contention

That assuming (but only for the purpose of discussing this contention) that DeForest has proved a disclosure of the invention as of January 1, 1921, he was utterly lacking in diligence and had totally neglected the completion of the invention.

The fact that DeForest had neglected this invention from the date of his conception to June 30th, the date when he submitted it to his attorney, is so conclusively established—indeed, admitted—that it is difficult to see how he can present any argument in support of diligence. True, he and his witness Garity at first attempted to excuse lack of diligence on the ground that DeForest had but one machine for photographing film, and Garity said that the cost of a second would be a matter of some two or three thousand dollars, but this was all exploded on cross examination when it was shown that DeForest had these two machines as early as February 18, 1921—two months before the entry of Vogt et al. into the field. As it is admitted by his witness Garity that DeForest only lacked a connecting shaft for these machines to be in possession of the full mechanism for trying out the invention, there would seem to be no excuse whatsoever for his failure to attempt to complete the invention.

We note, however, the testimony by DeForest in regard to his being extremely occupied during the period in question in working on his "three methods of recording sound * * * *to determine which was the most practical*" (R., p. 21), and inasmuch as he contends that this work should [fol. 183] be taken as diligence in the perfecting of the invention at issue—an entirely different invention—it may be well to discuss this point first before taking up the other testimony on diligence.

It will be understood that the recording of sound on film was a well understood and known accomplishment at the date of DeForest's conception of the invention at issue. It is disclosed in numerous patents and had actually been accomplished not only by others but by DeForest. It may be well to point out here that in the above referred to companion interference #51947 between DeForest and these same inventors, the invention there at issue was this very idea of recording sound on film by a particular lamp—a glow lamp. DeForest won that interference before the Examiner on this very contention of his diligence in working on the problem of sound recording. It availed him there because sound recording by glow tube was the invention there at issue; but it cannot avail him here. Such work was work in completing the invention of that issue; but in this case he has totally neglected the invention here at issue in order to continue on that other work to find out

which of several different light sources "was the most practical." That was his privilege. But he cannot now complain because he totally neglected the invention here at issue to continue to research throughout the ramifications of the problems relative to recording sound.

His notebook shows that at the time when he should have been diligent with the invention here at issue—if he had conceived it—he, instead, was exploring every conceivable arrangement, combination and system of instrumentalities for recording sound, with a view, no doubt, of protecting all valuable ideas along that line. He was trying out all of these various systems, methods and devices not only with one particular source of light, but as he testifies and as his notebook shows, he was trying it out with each of the three different sources of light which he thought [fol. 184] would be operative for the purpose, i. e., the fine incandescent filament first, then the speaking flame, and then the glow tube. In this connection, we refer first to his record in said companion interference, at page 88, where, referring to this work of sound recording, he states—

"I therefore began in the summer of 1919 to actually photograph sound waves, using these three methods. I continued these researches extensively through the fall of that year and through the ensuing year 1920 and to the latter part of July, 1921, with practically no let up, except when I was away from the city on business for the company."

And at page 89:

"The very first recording was done with the short filament incandescent lamp for the reason that this device was the smallest and the simplest and was most easily transported from the factory to the dark closet in the office building. I was determined to carry out a most careful and thorough development work on all of these three fluctuating light sources and chose the simplest one at that time as the one to work on first."

Again at page 125 of said Record, he testified as follows:

X Q. 221. "Were you successful in the experiments in which you used these glow tubes"?

A. "*Yes, practically all of them operated,* some better than others, of course. *I had obtained very satisfactory talking film by this method long before I left New York,* and had even combined the pictures and the voice record on the same film in New York."

He thus claims that he had obtained satisfactory sound films by the glow tube light, the third type of lamp tried, [fol. 185] long before he left New York—referring to his going to Berlin in July, 1921, as here and also there testified to. From his previous testimony, above quoted, it is shown that he first worked out results with the incandescent filament type of lamp even before this; and his notebooks here record that he then took satisfactory sound film with the flame light, and thereafter with the glow tube. He therefore, like others, according to his records, was able to make "satisfactory talking films" prior to the entry of Vogt, et al., into the field of this present issue. They may or may not have been as perfect as DeForest ultimately hoped to get them, but it is shown by testimony in this case, and by his notebooks, that he had successfully recorded sound, *and as early as October, 1920, according to his notes, had gotten "excellent" records.* He sould readily have done so in conjunction with taking motion pictures to reduce the present invention to practice, if he had seen fit to do so—if he had not neglected and abandoned it for another solution of the problem, which apparently he preferred, as will later be shown.

His notebooks in evidence, from a period even prior to his conception, until the filing of his application in this case, both prior to and after the entry of Vogt, et al., into the field, contain numerous entries by him to the effect that utilizing a "speaking flame" lamp he got sound films which were "very good"—"Fine, excellent," "quite good," and similar remarks showing that he could record sound, so as to reduce this invention to practice if he had had a mind to do so. Such entries in his notebooks will be found, for example, at the following places, and there are many others: October 16th and 20th, "Good"; October 20th and 21st, 1920. "Very good"; November 9th, referring to experiments 7 and 8, "Very good, fine, excellent! Best yet," and other laudatory statements continuing on, and again on January 16th, 1921, with reference to experiments 2 and 3, "Excellent," "Excellent, best to date,"

[fol. 186] and again under March 22nd, "Best of all," and so on, continuing but with a different kind of lamp, after the entry of Vogt et al. into the field, as, for example, May 9th and 12th, "Quite good"; May 6th, 15th and 16th, "Best up to date," etc.

DeForest's testimony in this interference as to his work in sound recording is not that he was trying to get a sound record so that he could complete this invention, but rather that he was working on three different methods for recording sound, to see, not whether he could get a sound record, but *to see which one of three methods "was the most practical."*

It hardly needs any citation of authorities to this Court to support our contention that work in improving upon a different invention from the one at issue, or, what is worse, in contrasting the results of three already completed inventions, each different from the one at issue, cannot be accepted as constituting diligence in perfecting the invention at issue, nor as an excuse for neglecting it. DeForest reaped the benefits of his experiments with recording of sound by obtaining different patents on that subject. But we submit that that work cannot again avail him in this interference.

It was incumbent upon him, in order to protect his rights to the invention here at issue—if he had had a conception of it prior to Vogt et al.—to complete the invention by either using diligence in reducing it to practice or in filing his application. He did neither, and should suffer the consequences.

He is not in the position of a poverty-stricken inventor, for Garity testifies that during the year 1921, DeForest expended between upwards of $10,000 to $20,000 in phonofilm experimental work alone (R., p. 71). Nor was he in the position of one who did not have available to him the apparatus for reducing the invention to practice, for, as will next be shown, the only thing required by him to do this was to have one of his mechanics spend a day in connecting [fol. 187] the two machines together by a shaft. He failed to do this, notwithstanding the fact that from some time after the purchase of the camera in February on until the date of the filing of his application in July, the record shows that *he was making motion picture film*—recording and projecting sound and pictures—but producing the film not by the invention here at issue *but by another method,*

as will be pointed out—totally neglecting the invention at issue.

Referring now to the testimony bearing on the qeustion of diligence, or rather his lack of diligence, DeForest testifies (R., p. 28) that at least three-fourths of his time was devoted to the Phonofilm problem during the period in question. But he did not mean by this that this work was on the invention at issue. His subsequent testimony shows clearly that he was only referring by "Phonofilm problem" to the recording of sound. This is shown, for example, by his answer to X Q. 51, where he was asked if he had referred by that statement to the taking of picture and sound records, and he answered—

"Oh, not at all. I did not begin to take pictures until I purchased the camera from Herbert & Huesgen in February, 1921."

Also at Record, page 33, his attorney, after reminding him that his application was filed on July 16, 1921, asked—

"Had you attempted to actually use the invention of this interference prior to the filing date of your application? A. No, I did not for the reason that I had only one motion picture camera."

And then he went on to say that he had no available means to couple up the two cameras, one for sound and one for pictures, that he would have had to have "two cameras" and that he did not have the apparatus necessary to do [fol. 188] that. But this was not true—not after February 18th—because his witness Torma proved that DeForest purchased a motion picture camera from Herbert & Huesgen on that date, this being the camera that DeForest referred to in the above quotation. The purchase of that camera by DeForest at that date, therefore, robs him of any excuse for not having reduced the invention to practice after that date.

Before discussing the events after the purchase of the camera, which was still two months before Vogt, et al., entered the field, we will refer to Garity's testimony to show the attitude of DeForest at this time. Garity states (R., p. 59), with reference to DeForest's disclosure to him—

"The actual mechanical work was not done at that time because there was no necessity for it."

And again at Record, page 65, he states—

"The matter of timing it in with the picture was understood; it could be done; that is, using a sound camera and a motion picture camera for taking motion pictures was only a matter of mechanical convenience, of connecting the two cameras."

He was then asked (X Q. 53)—

"And he intended to do that later on? A. There was absolutely no use doing it then. *That would be an unnecessary expense and it was conceded so simple* that there was no use buying a camera to take pictures when we did not have a sound record to begin with" (by which he later says he meant decent sound record)* (R., p. 66).

[fol. 189] When again asked whether the picture and sound photographing was tried out, he answered, "It was not. It was conceded it was so simple it was not necessary going to the expense." When then asked how much of a job it would be to connect the two cameras for the purpose desired, he answered, "It is not any job." And then he says, "A mechanic could do it in a day." He then tries to save the situation by stating that, "however, the primary cost is the purchase of a moving picture camera which runs into two or three thousand dollars" (R., p. 67). Surely, Garity, his assistant, must have known that DeForest had purchased a motion picture camera. The testimony also shows that the camera bought for $330 did not cost what Garity said it would.

It was then shown through Garity—as well as by the notebooks themselves—that DeForest had a camera for taking sound films (which Garity describes) even before he purchased this motion picture camera. Garity then testifies that DeForest could have coupled up these two cameras merely by the work of one of his mechanics for one day (X Q. 64). Then the following testimony occurs—

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* The above quotations from the notebook show Garity to be mistaken as to DeForest not having a decent record. DeForest says he had "excellent" ones.

"X Q. 65. And that was not done up to when? A. *It was never done in my experience here with the DeForest radio.*

X Q. 66. And you were there for how long? A. For five years."

He says he was there until 1924.

DeForest did not see fit to have this one day's work done in order to complete the invention here at issue.

We, therefore, have a situation where it is conclusively established—inded, admitted—that DeForest had the two cameras, one for sound and one for pictures, as early as February 18, 1921, and that he was in full possession of all the means and instrumentalities for completing the inven- [fol. 190] *tion by making moving pictures according to the invention. But he did not do it.* His opponents were not yet in the field, and it was still time for him to have done so if it had not been his intention to entirely neglect and abandon that invention—if he had it.

The following proofs make it clear that DeForest had *deliberately* neglected and, indeed, had abandoned any prior conception he may have had as to taking sound and picture records on separate films. He himself admits, as above quoted, that after purchasing the picture camera he began to take pictures as well as sound. Senner likewise testifies that DeForest showed him film containing the combined sound and picture records within a week or ten days of the purchase of the camera. But as shown from the testimony, the two records were not taken or printed by the method at issue, but were both taken on the same film and printed together.

Now, in order to obtain these talking movie films, *DeForest had to do some kind of mechanical work.* Assuming that he had the disclosure of the invention at that time, he was free to make his election as to whether he would have a mechanic put in one day coupling up the separate sound and picture cameras then in his possession, so as to record on separate film according to this invention, or to go to the expense of buying and having the necessary delicate "sound head" mechanism attached to his picture camera in order to record sound and pictures directly on the same motion picture negative film where they would have to be developed together. It seems strange, indeed, if DeForest had the conception of the invention at issue, that

he should have elected this latter course as he did. Be that as it may, *he was free to make his election and he elected not to* couple up his two cameras so as to *complete the invention here at issue, but rather,* to go to the expense, of putting the necessary sound head attachments on his picture camera so as *to take his records by the other method.*

[fol. 191] *So far as shown by anything in this record, DeForest has never used the invention at issue, and Garity testifies positively that it was not used as long as he was with DeForest.* Furthermore, the record shows the apparent reason why DeForest abandoned his prior conception of the invention—if he ever had it—for the method which he did put into use. This is found in Senner's testimony, where, after testifying (R., p. 79) that DeForest had shown him film containing sound and picture records, he says he called DeForest's attention to the fact that the pictures were much under-exposed and the sound record over-exposed. Then the following significant testimony was given:

Q. 26. "Did Dr. DeForest describe to you any way that he had in his mind to overcome that difficulty?

A. *Well, he had many ideas,* and amongst others he had the idea of using a separate film for the picture and for the sound.

Q. 27. That is, one film for the picture and one film for the sound?

A. Yes; *which I immediately discouraged* on account of the impracticability to my mind; and *I recommended the use of more powerful lights for his subject,* in order to equalize the exposure—bring them up to the strength of the sound recording exposure."

This advice apparently DeForest heeded, and accepting it, *he abandoned the idea of two films,* one for sound and one for picture. Senner says that it was "within a week or ten days after the purchase of the camera" that he advised DeForest to drop the idea of using two films.

What appears to have happened was that DeForest, heeding Senner's advice, paid more attention to getting more nearly the same degree of light upon the portions of his film on which he was recording picture and sound, and by this precaution, and with a new developer which his notebook shows he had commenced to use with success, he was able

[fol. 192] to solve his problem without resorting to taking pictures on two films, and had totally neglected and abandoned that idea—if he ever had it—*until a new concept came into his mind:* that is, the concept of taking *enlarged* sound records separate from the picture, and then printing a reduction of same on a record with the picture. It was this last concept of June 30th, 1921, upon which his application was predicated, and no other. *The original concept was totally abandoned, if it ever existed.*

With reference to the new developer above mentioned, we call attention to the fact that in the early days, i.e., around the date of the alleged conception entries, when DeForest was having the trouble upon which those entries were predicated, the entries show that he was developing sound film for ten to eleven minutes (R., p. 25). Then at least by April 6th he had a Dr. Mees, of the Eastman Company, develop some film for him which semed to be an improvement on what he had been doing; and not long thereafter we find various entries showing sound film developed satisfactory for only three or four minutes. See, for example, the entry in the last notebook under May 12th, under experiments 7 and 9, that the film was "quite good," and then the note "developed in new (Mees) developer 4 minutes"; under May 9th, another entry under experiment 9, that the film was "quite good"; another entry under May 12th that "Best film and best of all the marginal records, and I think the best of all the Photion records. This and the preceding film developed in Mees developer. *This* for 3½ minutes. The preceding one for 4 minutes." Under May 15th and 16th a notation, "*Best up to date,*" and then immediately below that entry a notation, "Developed 5 minutes but in dilute developer (Mees type)"; and under June 3rd, "Best of all marginal records to date"; and again under experiment 8, "Developed 4 minutes No. 16 solution."

[fol. 193] There are various of these entries showing the successful results of this short acting developer which enabled DeForest to develop his film during a sufficiently short period so as not to fog the picture. Later on, he got down to 2 to 3 minutes. With regard to this question of development DeForest admits (R., p. 42) that as a general proposition you can usually develop film from 3½ to 4 minutes without fogging it, and even up to 5 minutes, and in some special developers up to 10 minutes. DeForest had hit upon a de-

veloper which solved his problems, and accepting Senner's advice, considered this a better method than the more troublesome idea of using two films.

We respectfully submit that we have established overwhelmingly through DeForest and his own witnesses and his notebooks, *that at the time of the entry of Vogt et al. into this field and thereafter,* and, so far as this record shows, up to the present time, *DeForest had totally neglected and abandoned his original concept of using two films, notwithstanding the fact that all the means for completing the invention were at his disposal.* Upon this alone he must fail. We have established, furthermore, that even the filing of the application of his patent in interference was not an act in continuation of that original concept. *That original concept had been abondoned completely and the application was filed on the entirely new concept of June* 30, 1921, *which rests entirely upon the idea of the advantage to be gained by taking sound record in relatively large dimensions and then reducing it for the picture.. This came too late.*

Authorities

DeForest contends that lack of activity over a period of a few months is excusable and should not be held to be a lack of diligence.

[fol. 194] While under special circumstances inactivity over a period of a couple of months or so has been excused, as for example, where the junior party was active on the invention at issue, at the time or just before his competitor entered the field, and the inactivity occurred only for a short period thereafter, or in cases where the junior party showed a desire to complete the invention but the circumstances were such that all of the means of completing the invention were not available to him, or where it incurred great expense which he was trying to arrange for, or circumstances of that kind. But no such special circumstances are present in this case. This is a plain case where there was no activity prior to or at the time his opponent entered the field or thereafter until DeForest got his new concept as to enlargement and reduction. It is also a case where *in the course of his work he had to make sound pictures and every facility was at his hand to do it according to this invention, but he deliberately did it another way.*

Under circumstances far less negligent then these, inactivity for even eight days has been held to be fatal.

In the case of Phil vs. Mersman, Com. Dec., 1903 (p. 367), the dates and circumstances were far more advantageous to the junior party than they are here. The junior party Phil conceived in January,1901, and filed July 8, 1901, a total period of seven months, a little less than in this case. The senior party Mersman filed his application on June 28, 1901, and stood on his filing date, which was but eight days prior to the junior party's filing. In this case there is a difference of three months. It was found that Phil was lacking in diligence, the Commissioner stating—

"From what has been said I am forced to conclude that while Phil was the first to conceive the invention he has not shown that he was exercising due diligence when the senior party, Mersman, made a constructive reduction to practice [fol. 195] by filing his application, and the latter is therefore entitled to an award of priority."

Another case is that of Feinberg vs. Cowan, Ct. App., D. C., Com. Dec., 1907 (p. 546).

F. disclosed the invention in September, 1903, and reduced it to practice about April, 1904—seven months thereafter. C. disclosed in January, 1904, and reduced it to practice in March, 1904. There was three months from the entry of C. into the field until F. reduced to practice—here it is the same—and C.'s reduction to practice was but one month ahead of F.—here it is three months. F. excused lack of diligence on the ground of his finances but it was held that he was lacking in diligence.

See Storer vs. Barr, Ct. App., D. C., Com. Dec., 1910 (p. 303), where is was stated—

"But anyway, there is the period of time between just prior to May 16, 1905, and July 19, 1905, which must be accounted for by him, Barr having in the meantime, July 17, 1905, constructively reduced the invention to practice by the filing of his application for the patent. It is no help to Storer to seek to explain the delay after July 19, 1905, unless he can satisfactorily account for the time between it and May 16, 1905. He has sought to do this by explaining that he wished to assure himself of the best form as well as all the forms in which the invention would be operative."

The losing party sought to excuse his delay during the two months just prior to the entry of his opponent into the field, on the ground that he was diligent thereafter, but the Court refused to accept this; and although he had been diligent after this period, the other party was awarded the invention due to lack of diligence at this critical period.

[fol. 196] The following recent decisions of this Court are pertinent to the lack of diligence in this case. In the above cited case of Beidler vs. Caps, the time during which diligence had to be shown by the junior party was about seven months. On this point the court stated:

"Of course, it was not necessary in order to constitute diligence that appellant or his mechanic should have been constantly at work upon the machine, *but it was necessary that* during that period *some time should have been devoted to it,* or a reason valid in law shown for not doing so. The fact that Smith alone could not have done the necessary work of the factory if he had devoted a part of the time between May 25, 1923, and January 1, 1924, to constructing the machine in question is not enough" (36 F. R. [2nd], p. 125).

In the case of Jardine vs. Hartog, the time in which diligence had to be shown was about five months. The invention related to a piston. The appellee did not enter the field by a reduction to practice as in this case, but only by conception. During the said five months it appeared that the appellant actually did considerable work on a piston that was only slightly different from that of the piston at issue, and it was argued that the difference was so slight and the effect of the changes from the other to the invention were so well known that the work upon the other piston should be regarded as actually work on the piston at issue. This court rejected the contention and made the following statement:

"In concluding his opinion, the Commissioner of Patents said: 'The party Hartog was the first to conceive and the first to reduce to practice, constructively, but even if the party Jardine had been first to conceive, his lack of dili-
[fol. 197] gence would prevent him from prevailing. It follows therefore that priority should be awarded to Hartog.'

"We agree with the views expressed by the Commissioner of Patents, and his decision is affirmed" (36 F. R. [2nd], p. 608).

Reply to DeForest's Brief

DeForest's brief is quite short—no doubt because there is so little of record that can be discussed in his favor. There are only three points in it that we care to refer to—(1) his argument that the simultaneous recording of pictures and sounds was the obvious and the universal practice and that therefore DeForest should be presumed to have disclosed simultaneously recording; (2) that the Patent Office tribunals' award to the senior parties was based "solely" on the interpretation of the issue as being limited to simultaneous recording; and in connection with this, their finding that the Greensfelder patent disclosed the photograph recording of sound and pictures which DeForest disputes; and (3) the statements in support of DeForest's alleged diligence.

On the first of these points, DeForest states at page 3 of his brief, that in the talking or sound motion picture industry "it is universal practice to make the sound record on a marginal edge of the standard film." In the first place, there was no universal practice in 1921 because sound talking pictures were not in commercial use. They were in laboratory use and shown in patents and there is no justification in the record for this statement. Patents of record in this case show that the sound record in some cases was made on the opposite face of the picture space; in others it was made on an entirely separate film; and in others it was made in between the pictures as well as on the marginal edge of the standard film. Furthermore, the quoted statement does not negative the fact that while the sound record [fol. 198] may be made on the marginal edge of the standard film, nevertheless the two records, picture and sound, may not have been made simultaneously; but on the other hand the sound record may be "scored" to the previously taken picture record and then photographed in this position on the positive.

On page 4 it is stated that "the obvious solution of the problem thus presented, which solution constitutes the invention in issue, was to photograph the picture, and simultaneously therewith photographically recording the sound,

on separate negative films," etc. This is nothing short of a statement that the invention in issue was an obvious thing. If so, then there was no invention to be patented. This only shows the extent to which DeForest has gone in his argument to try and have it presumed that he had a disclosure of the invention. Having obtained his patent he is estopped in this proceeding from making such an argument.

At page 17 he states that it is impossible to conceive the recording of an action and its incidental sounds unless they are recorded simultaneously. We have already pointed out that there is no foundation for this statement on the record, and that the statement is contrary to the facts and to present common practice.

As to the second point—the basis of the award of priority; DeForest states at page 2 of his brief, that the concurrent decisions awarded priority to the senior parties "solely" because of the above interpretation placed on the claims. We have already pointed out that the award was on three different grounds, namely, lack of conception because of this interpretation, which is certainly correct; lack of proof that the conception, whatever it was, was prior to the senior parties' date, and lack of diligence in reduction to practice; each of these findings being separate and distinct from the other.

DeForest further contends that the Patent Office erred in stating that Greensfelder disclosed everything in the issue except the simultaneous recording, whereas, according to DeForest's contention, Greensfelder did not make [fol. 199] such a disclosure. But it is clear from the decisions of the Patent Office tribunals that in holding the claims limited to simultaneous recording they were merely following the "usual rule" that each limitation in a claim must be regarded as essential; and they merely stated that the rule was strengthened in this case because of their finding with respect to the Greensfelder patent. Even as to our first contention—lack of disclosure—they did not ground their decision on the finding that Greensfelder showed everything else in the issue. As we see it, the disclosure of the Greensfelder patent is not at all vital to a decision in this case. As a matter of fact, however, we submit that in so far as the subject of this particular invention is concerned, the Board was right in their finding that Greensfelder disclosed everything but the simultaneous recording.

As to the Greensfelder patent, DeForest states, commencing at the bottom of page 17, that this patent does not disclose in any sense the photographic recording of sounds of any particular action, and that the patent does not contemplate combining the picture with "all" of the sound incident to the picture and does not photograph "sound waves." He further states that the patent "artificially produces" what is referred to as sound marks, etc. It is also stated that the patent discloses merely "marking on the film of control records." These statements are rather misleading and require a consideration of the counts, the method of recording sound, and the disclosure of the Greensfelder patent. In the first place, it is to be noted that the counts do not call for the method of producing talking moving pictures where "all" the sound is recorded, nor do they call for the photographing of sound "waves" so these two criticisms are at once dispensed with.

Talking or sound pictures cover a wide range. Such a picture may show an action of one or more people or things, with all of the incidental sound pertaining to the action, or [fol. 200] it may show a picture of action with only certain selected sounds, as for example where it is desired to reproduce a girl walking in a garden singing. The picture of the girl walking in the garden singing may be taken without any sound at all, and then she or another will sing the song in the studio where it is quiet and where no extraneous or interfering sounds exist, and a sound record is then made of the song "scored" to the previously taken picture, and the two then printed on a common film. Or a sound or talking picture may for example consist of a musician walking onto a stage and there sitting down and playing a piano. All of these and other combinations are commonly known and used species of talking or sound pictures.

The Greensfelder patent discloses the photographically making and reproducing of the latter type of sound picture, and so far as concerns the invention here at issue, it is just as applicable and pertinent as if it disclosed the recording of a voice instead of music. DeForest's brief gives the impression that the sound is only produced according to the Greensfelder invention by "artifically" making a mark or marks on the film. It is true that the patent does disclose this idea as one feature of the disclosure, but it is equally true that it also discloses *photographically*

recording of the sound marks as will be seen by a discussion of the patent itself.

Before discussing the patent, however, it might be well to point out that in the present commercial recording of sound, there is no such thing as "photographing of sound waves." In the system usually employed, the sound vibrations whether from a piano key or human voice, are caused to vibrate a diaphragm which in turn varies the resistance in an electric circuit containing a light known as a glow light, highly sensitive to changes in the voltage of the circuit due to the changes in resistance, and the light is thereby caused to fluctuate in its luminosity. It is these [fol. 201] light intensity fluctuations which are photographed in recording the sound whatever it may be, and therefore what is photographed are rays of light which, when developed on the film, consist of a series of fine lines or marks which stand for or represent the sound. To use these so-called sound records to reproduce the sound, it is necessary to have special reproducing instrumentalities, i. e., mechanism by which sound can be made utilizing this record. In the usual practice a constant source of light is projected through the film containing the so-called sound record, and since the record consists of a series of more or less translucent or opaque marks representing sound, this light thus projected will vary in intensity on the opposite side of the film and this in turn is allowed to impinge upon a light sensitive "cell" connected in an electric circuit and coupled up with an amplifier or loud speaker. The electric resistance of such a cell is very sensitive to changes in the impinging light, so that the current in the electric circuit is varied more or less according to the intensity of the light falling upon the cell, and this change of current in turn vibrates the diaphragm to produce sound.

Now in the Greensfelder patent, in that part of it not discussed in DeForest's brief, i. e., the part commencing on Record, page 96, line 83, it is pointed out that the sound marks are made by photographing onto the film the light which is varied by a shutter. We thus see that the sound record is produced on the film by actually "photographing the light intermittently passing through the aperture 26." Further down, line 107, reference is made to "the pianist or musician, who is to play the accompaniment to be recorded for the picture" watching the picture so as to be able to play the accompaniment properly scored to the pic-

ture. It is also pointed out, commencing line 115, that "he then plays the accompaniment to the picture, introducing whatever melodies, chords, compositions or sound effects [fol. 202] he thinks appropriate to the action of the objects or characters in the picture." And that * * * "the sound marks, corresponding to the sounds and expressions produced, are recorded on the film of camera 28." It is then described how the negative containing the sound record and the negative containing the picture, which have been separately developed, are printed upon a single positive film.

At Record, page 98, line 13, another system is described for photographing the sound marks, and at line 128, it is pointed out how the sound negative and the picture negative are printed to produce the positive.

At Record, page 95, line 17, it is pointed out that the sound is reproduced by projecting a controlled light beam upon a light sensitive cell such as a selenium cell, located in an electric circuit to vary the current therein so as to control suitable instrumentalities which in turn control the sound to be reproduced.

The only difference between Greensfelder's method and that now commonly in use for recording and reproducing sound, is two-fold. In the modern method it is possible to produce all of the incidental sound, whereas according to Greensfelder there is a limit to the amount and kind of incidental sound that he could practically record by his method. Also, in the modern method the variable current, set up in the electric circuit by projecting the light source onto the light sensitive cell, is utilized by certain instrumentalities to operate a loud speaker diaphragm which produces the sound, whereas in Greensfelder the variable electric current set up by the cell is utilized through suitable control instrumentalities to produce the sound, and it requires the presence of the instruments which originally produced the sound or similar ones. The patent does nevertheless disclose photographing of the sound, in the sense of photographically producing a sound record, and a picture record, each on separate films, and then printing both on different portions of the same film.

[fol. 203] As to the third point—DeForest's statements in support of his alleged diligence—it is stated at page 2 of DeForest's brief that only three months elapsed between his recorded conception and his filing date, of which

approximately one month was taken up in the preparation of his application. Both statements are incorrect. The elapsed period was six and a half months, and he did not submit data to his attorney until about two weeks before his application was filed.

At page 10 he admits that the simultaneous recording of sound and picture on the same film might have required reduction to practice, but thereafter he proceeds to argue that it was not necessary to have a reduction to practice. His statement thereafter, that such a reduction to practice would have required the solving of many problems, is wholly at variance with Garity's testimony, that all that was needed was the coupling of the two cameras already in his possession. At page 11 it is stated, as another reason for not reducing to practice, that DeForest "had not reached the 'developing' stage in the system." This is wholly at variance with his testimony and that of his witness Senner, that at some time between February and July, 1921, DeForest was actually recording sound and picture records on the same film and developing them thereon.

At page 12 he admits, "It is true, that after recording the problem and its solution, he did not devote any part of that time, for the reasons stated, to reducing the present invention to practice." But on page 15, he directly contradicts this, stating that "DeForest had reduced the invention to practice very shortly after he acquired the camera"—meaning the camera purchased in February, 1921. This last statement was based on the erroneous assumption that the film taht DeForest showed Senner during this period, having both pictures and sound records thereon, was made according to the invention at issue; but which the testimony shows was not the case.

[fol. 204] Submitted

It is respectfully submitted that under the well settled rule, the concurrent decisions of the lower tribunals awarding priority to the senior parties on each of the grounds (1) that DeForest has not proven disclosure of the invention prior to the effective date of the senior parties and (2) that even if he had established a disclosure in time he was lacking in diligence, should be affirmed.

Respectfully submitted, Kenneth S. Neal, Counsel for Vogt et al. S. Mortimer Ward, Jr., of Counsel.

New York, N. Y., April 15, 1931.